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CONTENTS

208...From Your President
209...The Effect of Apical Inflammation of the Primary Teeth on Dental Caries in the Permanent Teeth.....*Joseph C. Muhler*
211...The Biological Effect of Various Carbohydrates Ingested During the Calcification of the Teeth.....*Ralph R. Steinman and Melvin I. Haley*
215...General Anesthesia and Pre-Medication in Dentistry for Children *Manuel M. Album*
224...Unit News.....*Ted Levitas*
230...The Application of the Rubber Dam in the Pre-School Child..*Paul Starkey*
237...Clinical Evaluation of Caries-Reducing Effect of a Dentifrice Containing 13% Carbamide and 3% Dibasic Ammonium Phosphate *Paul Vogel and Walter Hess*
243...Oral, Dental and Orthodontic Problems of Speech in Cerebral Palsy *Shulamith Kastein*
247...Erroneous Concepts in the Dental Treatment of Children with Cerebral Palsy *Jerry J. Adelson*
250...Morphology of the Root Canals of the Primary Molar Teeth *Edwin D. Hibbard and Ralph L. Ireland*
258...The Pedodontist and the Cleft Palate Patient.....*Ralph B. Neaderland*
262...Excessive Salivation—A Case Report.....*Woodrow S. Monica*
263...Report of Pedodontic Conference.....*Lewis J. Rattner*
265...Miami Musing.....*Ted Levitas*
267...Index—Volume xxiv

from your president

In accepting the Presidency of the American Society of Dentistry for Children, I accept the honor with mixed emotions, as I realize that anyone who follows in the footsteps of a man as dedicated and hard-working as Larry Burdge, has quite a task set before him, for during the past year Larry has led our organization with the utmost dignity and diligence. I shall endeavor during the coming year, to pursue the program which he initiated.

First of all, I shall strive to promote a better relationship between the A.S.D.C. program and those which we have in our Units throughout the country. I hope that each member of ASDC will strive to supplement our membership program, which will be directed by Dr. William Brown, our Membership Chairman. With your help this program can be one of our most potential building forces for a larger membership and, even more important, better Dentistry for Children. I am firmly convinced that the value of junior membership to the dental student is an outstanding one. In providing dental students with a junior membership, I think we will guide them into better ideals of Dentistry for Children.

Secondly, I feel that we must continue our regular membership program which was productive during the past year. I feel that there are many men in organized dentistry who would welcome membership in our group and that such membership would not only help ASDC, but would also stimulate the entire dental profession.

Thirdly, I shall strive to enhance our fine relationship with organized medicine through the American Academy of Pediatrics. We are indeed fortunate to work with Dr. Einar Christopherson, Executive Secretary of the American Academy of Pediatrics, who has continually promoted a better relationship between ASDC and the pediatric profession. We owe him and his Board of Directors many thanks.

I am hoping this year to provide a better liaison between our parent body and state Units. I shall try, through news bulletins and letters, to keep each state Unit well informed of the activities of the national group.

Remember we are planning our Annual Meeting in Texas in 1958 and that each of you must cooperate to make this the greatest meeting we have ever had.

As President of the American Society of Dentistry for Children, I know that with your help during the coming year, we shall accomplish much in our program to promote more and better Dentistry for Children.

ALBERT L. ANDERSON

The Effect of Apical Inflammation of the Primary Teeth on Dental Caries in the Permanent Teeth

JOSEPH C. MUHLER, D.D.S., PH.D.
Indiana University, Bloomington, Indiana

DENTISTRY has long recognized that hypoplastic enamel may be found in permanent single teeth, usually bicuspids, as a result of infection and apical inflammation of the primary predecessor. Chronic periapical inflammation of the primary teeth is therefore known to affect the ameloblasts of the developing permanent tooth. However, the literature fails to provide evidence in regard to the effect of periapical inflammation of the primary teeth on dental caries in the permanent teeth. In examining the radiograms taken as a portion of

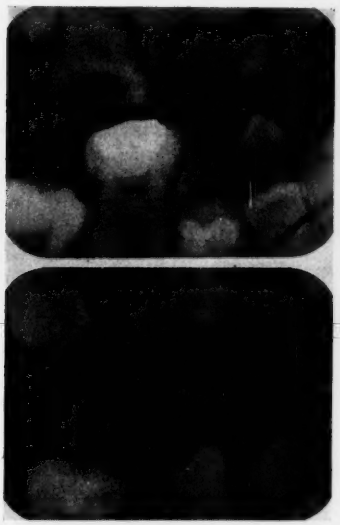

FIG. 1. A typical case illustrating dental caries in permanent tooth following extensive apical involvement of primary teeth. Note the large amount of caries in the primary maxillary first and second molars in the upper illustration; film taken 10-12-56. Note the distal cavity in the permanent first maxillary bicuspid on the lower illustration; film taken 7-16-57.

FIG. 2. Illustration of incomplete root formation of permanent tooth due to premature eruption as a result of extensive apical inflammation of primary tooth. Note incomplete root structure on maxillary first bicuspid in both illustrations. The occlusal surface of these maxillary bicuspids had incipient caries.

the dental caries examinations in the Indiana University Dental Study Program, it became evident that relatively large numbers of teeth, usually bicuspids, were affected by dental caries before they entered the oral cavity. This was determined by radiographic examination of unerupted permanent teeth *in situ* and noting interproximal caries. Moreover, it was a frequent observation to find occlusal caries in many instances when the teeth erupted. Two such cases are illustrated in Figures 1 and 2. In both instances periapical inflammation had persisted for several months and the permanent teeth were found to be carious when they erupted.

It is felt that a very convincing argument can be made for the elimination of periapical inflammation of the primary teeth, and if the elimination of this foci of infection is practiced, a noteworthy preventive dentistry service can be made. It seems inexcusable to permit infected primary teeth to remain in the head on the premise that they provide natural space maintainers for the permanent teeth or for any other reason, except for those medical cases which might require a temporary delay in the removal of the teeth. Evidence such as presented in Figures 1 and 2 can be used to convince parents of the need for having such infected teeth removed and artificial space maintainers provided in order to insure the sound development of the permanent teeth.

Since it is possible to develop dental caries in the permanent teeth *in situ* and before they erupt into the oral cavity as a result of the constant contact with inflammation, it seems of real interest to dentistry to learn more about the effect on the enamel surface of inflammation of contiguous structures. The importance of providing this information is that it may help materially in providing additional evidence concerning the etiological factors involved in the initiation of the dental caries process.

The Biological Effect of Various Carbohydrates Ingested During the Calcification of the Teeth

RALPH R. STEINMAN, D.D.S.* AND MELVIN I. HALEY, PH.D.†

CARBOHYDRATES, largely in the form of lactose, are a normal constituent of milk. Formulae for infants are often made by using carbohydrates other than lactose. The amount of carbohydrate in the formula may also be varied.

Sognnaes[1] from a study of rats which were kept on a high sucrose diet through several generations, concluded that the ingestion of sucrose during the formative period of the teeth affects the subsequent caries experience of these teeth. The teeth of Rhesus monkeys formed while the animals were on a high sucrose diet were also susceptible to decay, whereas those teeth which formed before the animals were placed on a high sucrose diet were caries immune. An analysis of the caries experience on Scandinavian children during and after World War II tends to support this conclusion.[2] The addition of ashed laboratory chow to the high sucrose rations fed rats decreased the amount of decay in the offspring.[3] This might suggest that the increase in caries on the refined diet alone could be due to a lack of some important unknown constituent in the diet.

The stages of development of the molars of the albino rat have been reported in detail by Hoffman and Schour.[4] From the beginning of calcification of the first and second molars to their eruption into the mouth corresponds approximately to the suckling period. The calcification of the third molar involves the last quarter of the suckling period and extends approximately 14 days beyond weaning. The suckling period of the albino rat is 21 days. These studies were conducted to determine the possible effect that various carbohydrates may have on the molars from the beginning of calcification to their eruption into the mouth.

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EXPERIMENTAL

During the suckling period carbohydrate in addition to that found in the milk was given to the suckling young three times a day, morning, noon, and night. The remainder of the time the young rats nursed *ad libitum*. The additional carbohydrate was given by means of an eye dropper in roughly a dosage of 1 gram to 1000 grams of body weight. These carbohydrates were made up into 20 per cent solutions.

In one of the first studies using this technic[5] each litter from 7 dams was divided into 4 groups of approximately 15 animals each. Starting the day following birth, the following solutions were given to the young rats three times a day, until weaned at 21 days of age: 20 per cent sucrose, 20 per cent lactose, 20 per cent glucose, and 20 per cent total of a mixture of equal parts of glucose and fructose.

At weaning all animals were placed on

the cariogenic diet of the following composition; casein 24, sucrose 65; salts U.S.P. XIV; corn oil 5; dehydrated whole liver 4; vitamin mix[6] 2; choline 0.2 parts (Vitamin A and D drops were given once a week). All animals were sacrificed at 13 weeks and their teeth examined by grinding successive planes parallel to the occlusal surface, and examined under a 20 × dissecting microscope. The cavities were scored by the method of Shaw.[7] The results of this study are shown in Table 1.

The second study was conducted to determine the time during the suckling period that these changes take place.[8] Thirty-six new born caries-susceptible rats from 6 litters were divided into 4 equal groups. Twenty per cent sucrose solution was administered orally in amounts not greater than 1 to 1000 of body weight. One-fourth of the animals received drops 3 times a day from the day following birth through the 6th day. One-fourth received drops 3 times a day from the 7th day through the 13th day. The next group received drops 3 times a day from the 14th day through the 21st day. The last fourth received only maternal milk throughout the suckling period. When weaned at 21 days of age all animals were placed on the cariogenic diet. All animals were sacrificed at the end of 13 weeks and the molars examined as previously outlined. Table 2 gives the results of this study.

TABLE 1

Carious Lesions in Animals Given Added Carbohydrates During Suckling Period

Solution	Number Animals	Score
20 per cent Sucrose	14	52.6
20 per cent Lactose	15	34.7
20 per cent Glucose	18	36.9
20 per cent Glucose Fructose	15	41.2

t Value
Sucrose—lactose 2.45
Sucrose—glucose and fructose 1.76
Sucrose—glucose 2.96

TABLE 2

Time of Administration of 20 Per Cent Sucrose Solution and Resulting Caries

Time, days	Number Animals	Score	t-Value Comp. with Control
1 to 6	9	37.7	3.35
7 to 13	9	41.8	2.55
14 to 21	9	46.3	2.94
Control	9	19.8	

In the previous studies it is not possible to determine the per cent of the total diet the added carbohydrate comprises. To determine the amount of added carbohydrate necessary to produce an increase in caries the following study was conducted.

At 14 days of age the young were taken from dams and divided by litters into groups. A large water bath was used to keep the living quarters of the young at a constant temperature of 85° F. The formula used to feed the young was that used by Reyniers et al.[9] This formula was altered in carbohydrate content as outlined later. This was fed to the rats by means of miniature baby bottles. The end of the nipples were cut at an angle to make a hole about 3 mm in diameter. The bottles were held by rubber bands at a slight angle from the horizontal and placed in flat plastic dishes formed from plexi-glass. This allowed milk to be present in the opening of the nipple but did not allow it to run out. The first day or two the animals were held to the nipple every two hours. The animals received their nourishment by licking rather than by sucking the nipple. In about two days they learned to feed

TABLE 3

Carbohydrate in Formula Given from 14 to 21 Days of Age and the Resultant Caries Score

Group	Number Animals	Carbohydrate Added			Score
		Lactose	Sucrose	Total	
1	16	1.85%		4.85%	5.2
2	17		1.85%	4.85%	9.6
3	16	5.35%		8.35%	14.8
4	16		5.35%	8.35%	25.4

Significance	t Value
Group 1 and 2	1.57
Group 3 and 4	2.02
Group 1 and 3	2.38
Group 2 and 4	3.58
Group 1 and 4	4.39

ad libitum. The bottles required washing and refilling about twice a day. The heat of the cage kept the milk warm enough for animals at this age.*

Reyniers' rat milk formula contains 3 per cent carbohydrate. To determine what effect the concentration and kind of carbohydrate in the formula may have on the developing teeth the following study was conducted. Sixty animals were divided into 4 groups at 14 days of age and placed on one of the following formulae. Group 1 received Reyniers' formula to which had been added 1.85 per cent lactose making a total carbohydrate concentration of 4.85%. Group 2 had 1.85 per cent sucrose added to the Reyniers' formula making a total carbohydrate concentration of 4.85%. Group 3 had 5.35 per cent lactose added giving a total carbohydrate content of 8.35 per cent. Group 4 had 5.35 per cent sucrose added giving a total of 8.35 per cent carbohydrate. The animals were placed on this formula at 14 days of age and weaned on the 21st day. At weaning all animals were placed on the cariogenic diet. At the end of 14 weeks all animals were sacrificed and the molars examined and charted as previously outlined.

At weaning no significant difference in weight was found. Growth and development appeared normal. Table 3 shows the resulting caries scores.

Discussion

From the standpoint of human nutrition the two most important carbohydrates used in these studies were sucrose and lactose. This discussion will be confined to these two carbohydrates. Of all the carbohydrates added by drops or by addition to the formula, the greatest increase in caries was obtained by using sucrose. At least 80 animals have been given sucrose in these and other studies.

The smallest increase in caries had been found following the administration of lactose. This was true whether the lactose was given by drops or by addition to the formula. A total of 69 animals were used in studying the effect of lactose in this and other studies. In all of the groups receiving lactose it was noted that the increase was not uniform. Apparently some animals were affected by the addition of lactose and others were not.

In comparing the results obtained when drops are given to the young with the results obtained when the animals are given the artificial formula it would appear that the amount of carbohydrate added to the diet by means of an eye dropper is quite small, perhaps less than 2 per cent. In the sucrose studies using drops, the increase in caries over the litter mates not so treated was about 100 per cent. In a study of 60 animals, half of which had 20 per cent lactose drops three times a day over litter mates not so treated, there was an increase in caries of only 10 per cent. The relative differences between sucrose and lactose are about

* The feeding technic was worked out by Mr. Pat O'Day and Mr. Bob Kinzer.

the same regardless of whether the added carbohydrate was administered by drops or added to the synthetic formula.

The studies using the artificial formula have fewer variables because the food was all the same and there was no other food in the cage as was the case when the animals were with the dams. The amount of carbohydrate in the diet is also of considerable importance. The addition of only 1.85 per cent sucrose produced a significant increase in caries. Of course the addition of 5.35 per cent sucrose produced an even greater increase in caries. The average American diet contains about 18 per cent added sucrose. No one would question the fact that the average child and adolescent gets this proportion of sucrose. If one considers that there are teeth developing and erupting in the human mouth from birth to maturity one might question the effect this added sugar may have in increasing the caries susceptibility of the teeth of the average American. The sweet desserts, the between-meal snacks high in sugar and very low in other nutrients, when eaten by children may play a very important part in increasing the caries susceptibility of the average American.

The same question could be raised concerning many of the common formulae used for infant feeding. Breast feeding is of course the best method of infant feeding with a normally lactating mother. From all of the studies presented in this paper, lactose is the carbohydrate of choice for infant feeding when breast feeding is not possible. What effect the other carbohydrates so often used in formulae may have on the forming teeth is certainly open to question.

Conclusion

1. Carbohydrates when given during the calcification of the teeth of white rats increased their caries susceptibility. 2. Carbohydrates differ in their ability to produce this increase in caries susceptibility. 3. Of the carbohydrates studied, added sucrose caused the greatest increase in caries. 4. Of the various carbohydrates given during the calcification of the teeth, added lactose caused the least increase in subsequent caries.

Bibliography

1. Sognnaes, R. F.: Caries in rodents on a purified diet. J. Amer. Dent. Assoc. **37:** 676, 1948.
2. *Idem.* An analysis of a war-time reduction of dental caries in European children with special regards to observations from Norway. Am. J. Dis. Child. **75:** 702, 1948.
3. *Idem.* Experimental rat caries; IV. Effect of natural salt mixture on the caries-conduciveness of an otherwise purified ration. J. Nutrition **53:** 195, 1954.
4. Hoffman, M. M. and Schour, I.: Quantitative studies in the development of the rat molar. Anat. Rec. **78:** 233, 1940.
5. Steinman, R. R. and Haley, M. I.: Early administration of various carbohydrates and subsequent dental caries in the rat. Journ. Dent. Res. **36:** 532, 1957.
6. Register, U. D.: Effect of Vitamin B_{12} on liver and blood non-protein sulfhydryl compounds. Journal Biol. Chem. **206:** 705, 1954.
7. Shaw, J. H. et al.: Dental Caries in the Cotton rat; I. Methods of study and preliminary nutritional experiments. J. Nutrition. **28:** 333, 1944.
8. Steinman, R. R. and Haley, M. I.: Effect of preweanling administration of sucrose on subsequent caries. Proc. Soc. Exper. Biol. & Med. **94:** 391, 1957.
9. Reyniers, J. A. et al.: Lobund Reports **1:** 26, 1946.

General Anesthesia and Pre-Medication in Dentistry for Children*

MANUEL M. ALBUM, D.D.S.

IN THE dental care of children seen during our daily practice, we are occasionally confronted by obstacles that make it difficult to render honest and sincere treatment. A child may have any one of a number of things which label him an impossible patient unless we, as dentists, recognize these features and approach the child in a different and more kindly manner.

Not all dentists desire to treat children and consequently pay little attention to their teeth, or else do poor dentistry; and instead of having a potential practice builder in the chair, the dentist produces a dental cripple and a deficit to his practice. Many youngsters require more patience in their treatment than adults, and this results in a tendency on the part of the dentist to hurry these children and unfortunately traumatize a potentially good patient. The youngsters are then shunted from office to office and in time become an untreatable individual. There is really no such thing as an untreatable child patient. In the case of the handicapped child, no matter how severe his physical handicap, there is still some method of treatment for the patient. There are many ways children can be treated successfully by a dentist, either in the office or in the hospital. This paper will discuss the methods of pre-medication in the office and the application of general anesthesia under hospital conditions.

It should be remembered that the first approach to the child should be a kindly one to gain the child's confidence and to acquaint him with the dental environment before attempting any dentistry. Usually this is satisfactory and the youngster is able to have dentistry performed. If you have a nervous, apprehensive child, things can be done. He can be given one of the Mephenesin[1, 2] derivatives to produce muscle relaxation and thus reduce his apprehension. This is not a lasting effect and usually disappears a short time after it produces its effectiveness. The patient is awake, relaxed and in a state of lessened fear concerning the approaching dental work. Demerol by itself may also be used to decrease nervous apprehension.

If the dentist desires complete sedation of his patient, a barbiturate like Nembutal or Seconal and Demerol is indicated. Dental practitioners have in the past been somewhat leery about barbiturate medication to overcome dental fears, and the amounts when given, were insufficient and produced unfavorable results. This is the result of not having a thorough understanding of the medication or not being properly acquainted with its pharmacologic and physiologic properties. Drugs like Nembutal, Seconal, and Demerol are wonderful agents when used properly and can be helpful practice builders.

Premedication depends on many factors and with proper evaluation, excellent results can be obtained. We must realize that children because of their basal metabolic rate and unstable nervous systems require more sedation than a grown indi-

* Presented at the 1956 Convention of the American Dental Association, Atlantic City, N. J.

vidual. From 2 years to 10 years is a period when correct dosage is necessary for effectiveness. This is due for the most part to the growing stature of the child. Children during this period use up tremendous amounts of energy and are always on the go. From 10 years until 15 years the physiology of the body is leveling off, and after 15 years, the dosage assumes the normal adult requirements. Another factor to be considered when applying dosage is the degree of apprehension in the child. A highly nervous individual will require a larger dose than normally given. In the handicapped child with cerebral palsy or mental retardation, the amount of brain damage determines the required dosage. If there is a severe amount of destruction to the brain, the normal dose would not be very effective. The dosage in these cases is determined by the initial visit which is really a fact-finding-visit designated to obtaining the effective dose for the individual (Table 1).

The important interpretation in premedication lies in understanding that we are dealing in dosage for children and not in modifications of adult doses. Some patients may be on drug therapy and in these instances, it would be quite difficult to obtain adequate results. It may be necessary to go into higher dosages which might not be effective or else use some other form of medication (Table 2).

The average dose to produce sleep does not depress respiration, but extremely large doses can cause death by respiratory failure, hence one must determine what is considered an average dose and what is a large dose. And again one must realize we are dealing with doses prescribed by the practitioner. It must be remembered that infants past 3 weeks of age can consume twice the adult dose and yet not exhibit injurious effects. There is in reality a wide safety margin in the administration of barbiturates.

TABLE 1

Correct Dosage Depends on

1. Physical Condition of Patient
   (a) Over-all physical condition
   (b) Brain damage
   (c) Body weight
2. Age
   (a) Unstable nervous system
   (b) Basal metabolic rate
   (c) Blood pressure
3. Degree of Apprehension
4. Initial Fact-Finding Visit Dosage

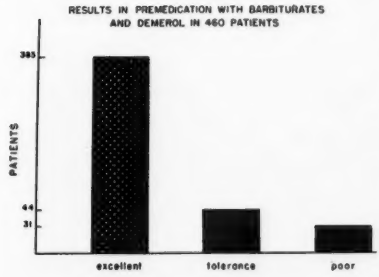
TABLE 2

Poor Results in Premedication Due to

1. Insufficient Initial Dosage
2. Inability to Retain Medication
3. Improper Administration
   (a) Parental advise and cooperation
   (b) Child cooperation
   (c) Combination of drugs used
4. Brain Damage to Handicapped Child
5. Daily Use of Drugs
   (a) Tolerance to drugs
   (b) Cross-tolerance to drugs

One of the faults in not obtaining true sedation in a child patient is the insufficient initial dose. In pre-medicating children, one can not utilize any of the so-called standard rules or formulas. If the practitioner adheres to these rules, he will not acquire the result he is striving to achieve. One must establish a dose for each individual and then work from there. The axiom I have used in my study of sedation is simply this—it is easier to add to sedation than it is to withdraw (Table 3). One must establish a minimum dosage background for every individual. In this manner you administer no more than is actually needed. In every case, we must establish what is considered to be the effective dose for that individual. Almost every patient we have sedated, basically has the same initial starting dose. This dose ranges from 2½ to 3 grains of the barbiturates (Table 4). Barbiturates produce hypnosis but do

TABLE 3

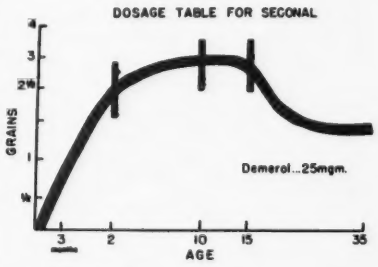


not remove or lessen pain. A dose of the barbiturates given for an x-ray examination may be effective but the same dose given to perform a pulpotomy or operative dentistry will not produce a cooperative patient. Consequently when dentistry is contemplated, it is wise to combine a barbiturate like Seconal or Nembutal with Demerol. Demerol reduces the incidence of pain and has a synergistic property with barbiturates. In addition it produces dryness in the mouth. Thus we create hypnosis and the removal of pain at the same time. This will enable the dental work to proceed more smoothly. [*Author's note: Since delivery of this paper, office medication of a barbiturate and demerol has been supplemented with scopolamine.*] Local anesthesia can be given without any difficulty under this medication. The dose of Demerol is calculated according to the body weight of the patient and when used in combination with the barbiturates, the initial determining dose should be around 25 mgm. It may be necessary to give larger doses than 3 grains of the barbiturate and 25 mgm. of Demerol, but this can only be ascertained from the determining initial dose and through experience.

The maximum effectiveness of barbiturates occurs at the end of 1 hour. Demerol also reaches its peak at that time (Table 5). If at the end of an hour nothing has happened, it is permissible to give the child a second dose which is less than the original dose of the barbiturates and Demerol. For example, an initial dose of 3 grains of Seconal or Nembutal and 25 mgm. of Demerol is administered to a 3 year old youngster weighing 25 pounds. At the end of an hour nothing has happened. An additional dose of ¾ grain of the barbiturate and 12 mgm. of Demerol should be given. The sum total of these two doses would be the starting dose for the second visit, should it be necessary. In some instances, it may not be possible to obtain satisfactory results and each case must be determined according to the circumstances surrounding the individual child patient. Thus each case is an entity, and should be developed accordingly. However, following the rule of sedation I have used on patients for determining from their initial visit the dosage applicable to that individual, the results have been effective and successful. Determining dosage in this fashion is safe.

The instances where the correct dosage

TABLE 4



CHILDREN HAVE:

1. Unstable nervous system
2. Different basal metabolic rate
3. Hypotension

NOTE....Infants past 3 weeks can consume twice adult dose.

is difficult to obtain concerns those children who have taken barbiturates over a long period of time and may develop a tolerance for the barbiturates. When the patient receives some other barbiturate, he may acquire a cross-tolerance to any form of barbiturate (Table 2). In these cases, the child should be changed to some other medication or else taken off of all drugs and discharged for a period of several months before contemplating any future dental work under medication.

When medication is given to a child, the parent should be informed that the child should be put to bed and that he will sleep for several hours, or for the rest of the day and perhaps the night. After the youngster awakens, he will be thirsty and his actions will be unsteady. This will disappear in time. It takes from 24 to 48 hours to throw off the effect of the medication used. Children should always be accompanied by a parent, since it will be necessary to carry them home from the dental office.

A word should be said concerning those cases where the child becomes highly excited following sedation. This is the result of an insufficient initial dose and after some sedation has been obtained, the patient may pass through the same excitement period while the drug is wearing off. Idiosyncrasies to the barbiturates are rare. Urticaria may occur but this will disappear following the elimination of the barbiturate.

TABLE 5

WORKING TIME OF SECONAL & DEMEROL

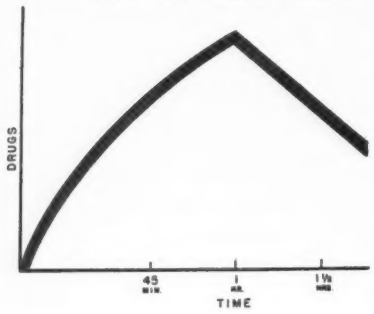


TABLE 6

Methods of Drug Administration in Premedication

Name of Drug	Method of Administration			Dosage in Drug
	Oral	Intramuscular	Rectal	
Seconal	Capsule	Yes	Yes	Capsule—¼, ½, ¾, 1½ gr.
	Elixir			Elixir—¼ gr. per tspn.
Nembutal	Capsule	Yes	Yes	Ampule—¾ gr. per cc.
				Suppository —1, 2, 3, gr.
	Elixir			
Demerol	Tablet	Yes	No	Tablet—50 mgm.
				Ampule—50 mgm. per cc.
				(1 mgm.—1 lb. body wt.)

The preferred methods of administration of barbiturates and Demerol are orally or intramuscularly (Table 6).

In cases where it is impossible to perform any treatment for the child, including the use of pre-medication, the child should be hospitalized and the dentistry performed under general anesthesia. This phase of treatment is of extreme importance and applies to both normal as well as handicapped children.

The use of general anesthesia under hospital conditions for the dental needs of children is sometimes difficult, but the application of general anesthesia following a definite pattern will overcome any obstacles that might arise.

Hospitalization of children for their complete operative dentistry can now be accomplished. Working on children under a prescribed hospital technique will do much toward restoring the child's and the parent's faith in dentists and re-educate them concerning proper care for the existing dental conditions. It is possible under this technique to reduce the number of treatments to one visit. This is of extreme importance when patients come long distances for dental care. Upon completion of their dentistry under this treatment, the child ceases to be frightened and often changes completely for the better.

Any technique including the one used by us, is only as safe as the skill of the anesthesiologist and his knowledge and understanding of anesthetic agents. If there is no complete understanding on his part, it becomes easy to inflict permanent injury to the patient as well as embarrassment to the operator. This is more evident in the handicapped patient than the normal child.

Some anesthetic procedures used today consist of inducting the patient with di-vinyl ether or Vinethene, and then carrying them under nasotracheal anesthesia with either nitrous oxide-oxygen or ether for the required dental work. Others have performed dentistry under open drop ether anesthesia as well as through the use of sodium pentothal. In anesthesia, it is important to remember that there should be complete cooperation on the part of the child prior to and during the induction phase of the anesthesia. A child who is comfortable, not frightened, and properly pre-medicated will contribute greatly to the efficiency of the anesthesia.

When the first cases were treated at Children's Hospital in Philadelphia some years ago, induction was with cyclopropane-ether and a nasotracheal tube utilizing nitrous oxide and oxygen. Relaxation was obtained by intermittent intravenous injections of sodium pentothal and curare. Although it was possible to do all types of dental operative procedures, full awakening of the patient was often delayed. In addition some of the younger patients were difficult to maintain on a satisfactory intravenous drip. This technique like so many of the other procedures, dealt with combustible agents. The dental engine could not be connected until the nitrous-oxide was in use. The problem always present was that static electricity might be created at one time or another and that combustible agents might still be present in the air during the dental operation. In the search for a more perfect technique, it appeared that trichlorethylene might be better suited to our needs and that it might overcome the objections of our earlier methods.

In order to understand our technique, it is necessary to familiarize one's self with the background of trichlorethylene. In analgesic doses, trichlorethylene does not affect respiratory rate or depth, but in deeper planes, respiration becomes rapid and shallow. When this occurs, the concentration of trichlorethylene should be reduced. Trichlorethylene produces analgesia satisfactory for many minor surgical and dental procedures before the loss of consciousness. The continued administration produces unconsciousness, and deep anesthesia with trichlorethylene as the sole agent is not recommended, nor is it entirely safe.[4] Deeper planes will produce tachypnea and marked bradycardia which are absent during first stage analgesia. It should never be used in a closed system or in contact with soda lime since it decomposes into phosgene and carbon monoxide gas. Following the inhalation of trichlorethyl-

ene, a portion of the drug is metabolized and some eliminated through the lungs. There is less disturbance of liver function than occurs with chloroform or ether.

The group of patients under consideration were cerebral palsy, mentally retarded, muscular dystrophies, and normal children, ranging in age from 2 years to 16 years. Most of these children had difficulty maintaining good oral hygiene, needed extensive dental procedures, or were terrified of treatment and unable to be handled in the office. Children sometimes cannot or will not cooperate and it becomes necessary to resort to doing dentistry under general anesthesia. For safe anesthesia, a non-inflammable and non-explosive agent is essential. Prompt awakening with a minimum of side reactions is desirable because the patients are discharged as soon as possible. It is felt that with trichlorethylene in combination with nitrous-oxide and oxygen orotracheally and the use of succinyl choline as a muscle relaxing agent, we have the answer to these problems. The patient therefore is maintained in the first plane of third stage anesthesia. Oral tracheal intubation is now preferred because in young children there is less chance of injuring enlarged adenoid or tonsillar tissue as contrasted to nasal intubation.

It must be understood that one cannot proceed with any anesthetic technique until the patient is suitable for anesthesia. The patient is admitted to the hospital either the day prior to the actual operative work, or early the day the work is contemplated. The time of admittance determines when the patient is discharged from the hospital. The child is given a thorough physical examination to detect any cardiac murmur, rheumatic heart, chest lesion, tumor, etc. The finding of a cardiac murmur does not mean that a general anesthetic is contraindicated, but the knowledge of any abnormality or lesion will be helpful to the anesthesiologist in the administration of the anesthetic. Chest x-rays, urinalysis and blood studies must be done during this examination period. Skull x-rays should be taken on handicapped children. If the hemoglobin is below the normal of 10.0 grams per 100 cc. by volume of blood, the patient is not suitable for anesthesia and is considered to be a poor risk. A high leucocytic count indicates infections somewhere in the body and should be investigated prior to any anesthesia. Patients with colds, asthma, influenza or any other virus should be carefully evaluated before being given any anesthetic. Patients whose body temperatures are above 100°C should have the dental work delayed until the cause of the temperature has been established. Hot weather will influence the prolongation of the anesthesia and should be considered an important factor. The pre-operative work-up is the most important aspect of general anesthesia and is something that is closely entwined with a hospital background.

Pre-operative sedation is given 1 hour prior to the operative procedures and consists of Demerol or morphine, scopolamine and Nembutal calculated according to the body weight of the patient (Table 7).

Anesthesia is begun with a bag and mask in the semi-closed technique using a flow of 3 liters of nitrous-oxide to 1 liter of oxygen. As the patient becomes depressed, trichlorethylene is added to the mixture using a standard ether vaporizer containing 1.5–2 ounces of trichlorethylene. Although deep anesthesia can be achieved with trichlorethylene, it is not safe. The cerebral palsy child will seldom relax when using trichlorethylene by itself. To facilitate oral intubation and complete muscle relaxation throughout

TABLE 7

Suggested Preanesthetic Medication

Age	Weight	Demerol®	Nembutal®*	Scopolamine
2–3 yrs	25–30 lbs	20 mg	gr ½	gr 1/400
3–5 yrs	30–40 lbs	25–30 mg	gr 1	gr 1/300
5–8 yrs	40–55 lbs	35–40 mg	gr 1	gr 1/300
8–10 yrs	55–65 lbs	50 mg	gr 1½	gr 1/200
10–12 yrs	65–80 lbs	50 mg	gr 1½	gr 1/200
12–14 yrs	80–110	75 mg	gr 2	gr 1/100
over 14	110 lbs	100 mg	gr 2	gr 1/100

* Useful in very apprehensive children, but may be omitted.

the operative procedure, an intravenous drip solution of succinyl choline in 5 per cent glucose in distilled water is inserted into one of the veins of the arm or leg.

Following the oral tracheal intubation, anesthesia is maintained with nitrous-oxide and oxygen in proportions of 2:1 liters with traces of trichlorethylene using a non-rebreathing valve. The succinyl choline is regulated to the needs of the patient. The potent analgesic action of the trichlorethylene makes deep anesthesia unnecessary and the patient recovers his reflexes quickly once the anesthesia is stopped.

Any excess amalgam and debris remaining in the mouth after operative procedures is removed by flushing the oral cavity with water. This is accomplished without any fear on the part of the dentist providing we utilize the correct size oral tubing which establishes close contact with the tracheal wall. If it is not possible to aspirate all of the water and some escapes into the stomach, it will be removed during the oropharyngeal aspiration and tracheal toilet.

Extractions are done following the operative work and proper controls for bleeding carried out by the dentist.

A tube is now passed through the nose or mouth into the pharynx and stomach and any excess debris or fluid present is aspirated out. This step will also reduce post-operative nausea.

About 15 minutes before the completion of the anesthesia, the succinyl choline is discontinued and the patient receives an intravenous drip solution of 5 per cent glucose in distilled water. This is continued as per the post-operative orders when the patient is removed to the recovery room. The amount of the glucose and distilled water used is dependent on the patient and the length of the operative work. Fluids inserted in this fashion until the patient can administer to his own needs, will bring about an early recovery of the child.

As a rule following an early morning operation, it is possible for the child to be discharged late that same afternoon or early evening depending on the length of the operation, the amount of work done, and the physical reaction of the patient. Those patients worked on during the afternoon, are automatically kept overnight. If there is any question on the part of the dentist concerning the discharge of his patient, it would be advisable to have the child remain in the hospital until everything is satisfactory.

Summary

The child who has been shunted from dentist to dentist results inevitably in a traumatized youngster. With understanding of the child by the dentist, this condition need not exist. Good dentistry can be done for a normal child or a severely handicapped youngster with cerebral palsy or mental retardation and with pre-medication and general anesthesia, conscientious dentists needn't be frustrated in their desire to help these youngsters.

In the use of pre-medication in the office, the initial visit becomes a fact-

finding examination. Taking into consideration the child's age, basal metabolic rate, blood pressure, nervous apprehension, brain damage, growing stature, etc. will enable one to obtain proper and correct sedation for the required dentistry. When normal measures fail, it becomes a question of not only allaying the fears of the child, but also providing satisfactory working conditions under sedation.

Using an initial dose of 2½–3 grains of one of the barbiturates in combination with 25 mgm. of Demerol will produce a sedation which will be smooth, efficient, and provide little excitement on the part of the patient. An excitement period is only produced by insufficient and inadequate pre-medication. There is no need to have a youngster "climbing walls" when the dentist understands the background of the medication used as well as the child himself.

The safety factor latitude with the barbiturates is very wide and there should be no hesitation on the part of the dentist to use pre-medication as an adjunct to his practice. With the dosage used, there need not be any fear of respiratory depression or failure.

When it becomes impossible to utilize or obtain good results from pre-medication in the office for reasons of tolerance, brain damage, or inability to retain the medication, general anesthesia under hospital conditions may be used for the required dental procedures. This technique is very useful in instances where patients travel long distances for treatment of extensive dental needs.

Using nitrous-oxide and oxygen in combination with trichlorethylene and the administration of succinyl choline as a muscle relaxing agent, will provide a smooth anesthesia with little discomfort to the patient as well as to induce a faster recovery time.

The operative dentistry is done first under this technique, quadrant by quadrant. When all the cavities have been properly prepared, they are filled utilizing the necessary medicaments, cements, and amalgam and other permanent filling materials as used in the daily office routine. This again is carried out by quadrants.

Pulpotomies, jacket preparations, bridgework, and other procedures performed in the office can be done under this technique of general anesthesia.

Extractions should follow the operative work. Sutures as well as hemostatic agents should be used where indicated.

Under the technique of general anesthesia, the patient as well as the dentist should not settle for second-grade dentistry. The conditions are ideal in every respect for the finest type of dentistry.

With the afore-mentioned techniques, it is possible to perform excellent dentistry with definite favorable results on the difficult, obstreperous, and hard-to-manage child patient.

Conclusions

1. There is no such thing as an untreatable child patient, whether he be normal or handicapped.

2. Should it be impossible to treat a child under normal procedures, he can then be either pre-medicated in the office or worked on under general anesthesia in the hospital.

3. Pre-medication in the office depends on proper evaluation of the patient, as well as an understanding of the pharmacology of the drugs used. One can not use any of the so-called formulas or rules for sedation, but must treat each case with the correct dosage for that individual.

This is obtained from the initial visit which is in reality a fact-finding visit.

4. One must realize we are dealing in dosage for children and not in modifications of adult doses. With this understanding, the excitement stage and inadequate pre-medication can be eliminated.

5. Correct combinations of the barbiturates and other drugs will allow the dentist sufficient time to carry out the necessary dental procedures.

6. The use of general anesthesia following a definite pattern will overcome any obstacles that might arise.

7. Complete reversal of personalities for the better are produced following general anesthesia. A starting point is established in the child's mouth for any future dentistry and the dentist is able to gain the child's confidence, since simple procedures as polishing and cleaning can be performed without any discomfort to the patient.

8. Any anesthetic technique is only as safe as the skill of the individual administering the anesthesia.

9. General anesthesia for any lengthy operative procedures should be administered under hospital conditions.

10. The pre-operative work-up at the time of admittance to the hospital is the most important aspect of general anesthesia. This is followed by the actual anesthesia and the post-operative care.

11. Correct pre-operative sedation for general anesthesia will produce a smoother anesthetic and a more cooperative patient.

12. The discharge of the patient following a general anesthetic technique in the hospital is determined by the time of the operation as well as the length of the procedure and the physical reaction of the patient.

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BIBLIOGRAPHIES

1. Album, M. M.: The dental use of mephenesin in cerebral palsy patients: a preliminary report. Am. Dent. A.J., 45: 165-70 August, 1952.
2. Album, M. M.: Clinical observations on use of mephenesin in cerebral palsy patients. Am. Dent. A.J., 51: 51-5, July 1955.
3. Album, M. M.: Premedication for difficult children. J. Dent. Child., 22: 48-56, 1 st Quar. 1955.
4. Album, M. M. and Deming, M. Van N.: Trichloroethylene anesthesia for operative dentistry on handicapped patient. Oral Surg., Oral Med., and Oral Path., 7: 488-98, May 1954.

Unit News

As we crank up the dictaphone and ready the typewriter to prepare the copy for this 4th Quarter issue, football is in the air, schools are open, and everyone must be busy. Must be, I say, because most of our correspondents have been too busy to send in information about their respective Units!

To those of you who did not this time, please do next time. To those of you who did, thanks a million.

Arizona

Newly elected Secretary-Treasurer of the Arizona Unit is Dr. Charles Mehlum of Phoenix who reports that the other new officers of their Unit are Dr. Robert Huntington also of Phoenix, President, and Dr. Richard Rucker of Tucson, who is Vice-President.

It's good to hear from the Far West, and we will all be looking forward to hearing more reports of their activities.

Milton B. Asbell, D.D.S., Chief of Staff, (extreme right) admires equipment at the new A.L.L.-C.I.O. Municipal Hospital Dental Rehabilitation Center, Camden Municipal Hospital, along with his associates (left to right) Paul D. Zackon, D.D.S., Henry Wisniewski, D.D.S., Raymond Werther, D.D.S., Robert I. Kaplan, D.D.S., and Marvin Silver, D.D.S. The new clinic, located at the Camden Municipal Hospital, will be staffed by members of the Department of Dentistry, Children's Hospital of Philadelphia. Services will be provided for victims of polio and other crippling diseases, and out-patient dental care will be given to handicapped children.

Northern California

Dr. Robert A. Burley, Editor for this Unit, continues to be verbose—and this is great! His reports are always loaded with information and could really be used as an example for all the other editors.

This Quarter's report includes the news that Dr. Fran Bushnell, Dr. Louis DeMeo and Dr. Chuck Sweet, Jr., all became Diplomates of the American Board of Pedodontics this past August. Congratulations on this fine achievement!

Chuck Sweet, Jr., has been serving as Chairman for the 2nd Annual Seminar which was held in October. The Editor predicted a rousing success just like the one they had last year.

Dr. Irwin Beechen and Dr. Charles Sweet, Sr., recently returned from the University of Oregon, where they put on a post-graduate course. Dr. Sweet, Jr., is putting on a five-day post-graduate course at U.C.L.A. (California Extension). Membership Chairman Fran Bushnell has been organizing a program to invite all senior students from the University of California and the Physicians and Surgeons Dental Schools to become student members of the Northern California Unit. This sounds like an excellent idea and perhaps could be looked into by other Units in cities where there are dental schools.

Dr. Ed Mack recently returned from Europe by way of the "Polar Route" after presenting a paper at the International Dental Congress in Rome. Bob Burley reports word has been received that now the polar bears are quite receptive to dentistry for children. Dr. Barry Rodine presented a paper on "Interceptive Orthodontics" in San Diego. Dr. Win Edie brought home a year's supply of salmon after a recent fishing expedition.

The most recent meeting of the Northern California Unit was held in September in San Francisco where Dean Fleming from the University of California spoke on "Dental Manpower in the West." Their next meeting is scheduled for December.

This is really a terrific report!

Georgia

Seven speakers kept members of the Georgia Unit interested and occupied during their two-day Pedodontic Seminar held in September. The lecturers included a six-man team from London, Ontario, Canada, and a child psychiatrist from Atlanta. The Canadians comprise a team discussing orthodontics for the general practitioner, and the two subjects, although they might seem a little diverse, made for a most interesting meeting.

The next meeting of the Unit will probably be held in December for the election of new officers.

The Unit also extends a word of welcome to Dr. Ed Hibbard who has just moved here from Nebraska to assume his duties as head of the department of Pedodontics at Emory University School of Dentistry.

Hawaii

The direct relationship of carbohydrate intake to the incidence of caries was one of the main points brought out by Dr. Carey D. Miller at the April meeting of the Hawaiian Society of Dentistry for Children. Dr. Miller is Professor of Foods and Nutrition and head of the Department, Hawaii Agricultural Experiment Station, University of Hawaii.

In June, the Unit held its annual meeting and elected officers. (These names were not available at press time.) Dr. Balint Orban, professor of periodontics at the Chicago College of Dental Surgery, Loyola University, was the speaker for the evening.

Sounds like those fellows had two fine meetings!

Michigan

Jim Schofield reports that our Michigan Unit held its second meeting of the 1957–58 year at Ann Arbor on Wednesday December 4. A record crowd heard Roy M. Wolff of St. Louis, Missouri discuss "Management of Children and Parents in the Dental Office," and as always, Roy presented his material in an interesting, provocative manner!

The December meeting was the second of two well attended meetings, and the Unit is looking forward to a very successful Children's Dental Health Day in January, which will be co-sponsored by the Michigan Unit and the Detroit District Dental Society.

Western Pennsylvania

Sidney Spatz, D.D.S., Assistant Professor, Dept. of Oral Surgery, University of Pittsburgh addressed the members of the Western Penna. Society of Dentistry for Children at the Royal York Hotel, Nov. 21, 1957.

In the course of his talk Dr. Spatz stated that children who have a diastema between maxillary central incisors, can have the muscle attachment surgically removed from between the teeth, in selected cases, after the six permanent anterior teeth have erupted.

Children should have complete mouth radiographs at the age of five to determine if there is any abnormal development of underlying tissues of teeth in the five formative years.

At the business meeting the following officers were elected for the year 1958:

President—Dr. J. J. Bonello
President-Elect—Dr. Morton Winkler
Vice President—Dr. A. E. Michanowicz
Sec. Treasurer—Dr. W. C. Waller
Nominating Committee—Dr. John B. Dovey
Program Committee—Dr. A. E. Michanowicz, Dr. Robert G. Meisel
Membership Committee—Dr. Howard Tucker, Dr. Burton B. Reizner
Telephone Committee—Dr. Frances O'Loughlin, Dr. Frances K. Jaskell
Publicity Chairman—Dr. Jesse Quatse

Next meeting is to be held Jan. 9, 1958 at the Royal York Hotel.

Massachusetts

The Massachusetts Unit held its annual meeting on May 8th, at which time new officers were elected. These are: Dr. Egil Klinkenberg, President; Dr. Charles Boyers, Jr., Vice President; Dr. Leon Young, Secretary-Treasurer; Dr. Robert Kirschbaum, Editor; Dr. Robert Diamond, Program Chairman; and Dr. Stanley Kaufman, Membership Chairman.

At this same meeting, Dr. Kyrle Preis, Professor of Orthodontics at the University of Maryland spoke on the "Relationship of Habits to Mal-Occlusion." This meeting was held in conjunction with the annual meeting of the Massachusetts Dental Society, and the Unit put on an exhibit at their state meeting. Some of their subjects included: "The Importance of X-Rays in Children's Dentistry", "Preventive Orthodontics", "Good Operative Dentistry", "Oral Diseases in Children", "Proper Tooth Brushing" and "Nutrition".

Editor Krischbaum reports that both Dr. Preis and their exhibit were well received by all those who were able to be in attendance. Thanks for bringing us up-to-date, Bob, and keep up the good work.

New Mexico

Dr. I. L. Voda, Secretary-Treasurer of the New Mexico Unit, submits the first report from one of our newest component groups. Dr. Voda states that the New Mexico Unit was organized on February 11, 1957, with an organizational meeting in Albuquerque, which was called by Dr. Monica Novitski. He points out that it is through her efforts, primarily, that the New Mexico Unit came into being.

Other officers elected at that meeting are Dr. Arthur J. Wagner, Albuquerque, President and Dr. James Matthews, Albuquerque, Vice-President. Dr. Voda practices in Las Vegas. 21 charter members were present at that meeting and came from all parts of New Mexico. Their second meeting was held in May during the New Mexico state meeting.

In July, their first Pedodontic Workshop was held on the campus of the University of New Mexico. The morning session consisted of presentations by Dr. W. H. Danley, Jr., Dr. John McReynolds, and Dr. James Matthews. The afternoon session was a round-table discussion with Dr. Wallace Fanning serving as moderator and Dr. John Phelan acting as his assistant.

The original 21 members have now increased their number to 48. This, I think, is an outstanding achievement. The excellent report Dr. Voda has submitted indicates these fellows are certainly on the ball and should be headed for bigger and better accomplishments. Thanks for the splendid cooperation. Please keep up the good work—and the fine reports.

New Orleans

Although there is no Unit in New Orleans, we have on hand some interesting information from the Dental Division of the medical department of the New Orleans public schools and would like to pass it on to you.

The primary objective of the Division is education rather than treatment, says Dr. Mabel F. Wood, Director of Dental Activities. To facilitate this aim, a dental health committee is appointed in each school. Dental education programs were completed in 99 schools, 16 different films were used, and approximately 70,000 children were reached.

Numerous consultations were held with parents who requested them and special efforts were made to provide dental treatment for needy children. This has all the earmarks of an ambitious and worthwhile program, and Dr. Wood has hopes of expanding it still further.

New York

Dr. Robert Burchesky was recently named president of the Unit in the Empire State. Elected to serve with him for the coming year were: Dr. Abraham Kobren, President-Elect; Dr. Arnold Rosenberg, Vice-President; Dr. Charles Beck, Secretary-Treasurer; and Dr. Joseph Kauffman, Editor. Dr. Lionel Hildes, Dr. Roland Hawes, and Dr. Isadore Samuels were elected to the executive council for three years.

The Unit is making plans to celebrate the 25th anniversary of its founding in 1933, and is also working on plans for the 1959 Annual Meeting, which will be held in New York City.

Rhode Island

Dr. Roger H. Brown is currently serving as President of the Rhode Island Unit. He was elected at their annual Clinic Day meeting in May and chosen to serve with him were Dr. Ulysses T. Carter, Jr., Vice President, and Dr. Lee C. Nathans, Secretary-Treasurer.

In September, the Unit held its fall meeting at the Rhode Island Hospital. Dr. Martin T. Orne, author of several papers dealing with the nature of the trance state and its implications for theory and therapy discussed "Hypnodontics" and supplemented the lecture with demonstrations. Sounds like they should have had a terrific meeting. This is a subject that everyone is talking about currently.

Pan American Council of Dentistry for Children

A cordial, personal communique from Dr. Antonio Montero, secretary of the P.A.S.D.C., brings us up to date on the workings of this organization.

As was pointed out previously, the Council cancelled plans to hold its Second Annual Meeting in Havana, Cuba, and, instead, convened on Monday, November 4, at the Balmoral Hotel in Miami Beach.

Member groups belonging to the Council at this time are those in Canada, United States, Mexico, Cuba, Panama, El Salvador, Nicaragua, Colombia, Uruguay, Argentina, and a study club in Guatemala. A Society of Dentistry for Children has been organized recently in Venezuela and is planning to join the Council.

A quick look around the Americas tells us that Council members have been active. The Canadian Society of Dentistry for Children held its annual meeting last May in Toronto with 245 members present. Its program consisted of Table Clinics presented by Dr. Blake McAdam, Dr. Mel Noonan, Dr. Robert Rapp, Dr. L. Lamping and Dr. M. Johnston. The London (Ontario) Orthodontic Study Club presented lectures and Table Clinics on "Interceptive Orthodontics." (This panel, headed by Dr. Peter Currie, is really excellent. The group was in Atlanta (Georgia) in September and made a tremendous hit.)

Dr. Navarra, Director, and Dr. Iglesias, Secretary, of the Society in Uruguay report that their group keeps up to date with monthly meetings made up of new films and lectures.

From El Salvador comes word by way of Dr. Batista Mena that monthly meetings in June, July and September have kept the members on the go. The membership there now numbers 31.

The Cuban Society reports through its secretary, Dr. A. Cobelo, that it is working on a table clinic exhibit of the teaching material used at the Children's Clinic of the Dental School.

And that is a fine report from Dr. Montero who hoped to meet all of us in Miami.

Announcements

Tufts University School of Dental Medicine recently announced three post graduate refresher courses. A course in Orthodontic Principles of Interest to the General Practitioner will be offered on consecutive Wednesday nights for eight weeks starting February 5, 1958. A one week course entitled "A Special Participation Course in Periodontology" starts April 14, 1958, and a course, "Oral Medicine—Diagnosis and Treatment of Oral Diseases," will be held November 25–27, 1957. Complete details may be secured from the Director of Graduate and Postgraduate Studies at the School of Dental Medicine, 136 Harrison Ave., Boston, Mass.

Northwestern University Dental School has published a brochure listing its postgraduate courses, convocations and conferences for 1957–1958. Of particular interest to A.S.D.C. members would be the course on Pedodontics, February 6–7, 1958, and the one on Prosthetic Rehabili-

tation for the Cleft Palate Patient, April 7–8, 1958. Complete information about these and any of their other courses may be obtained by writing to the Director of Dental Postgraduate Study at the Dental School, 311 East Chicago Ave., Chicago 11, Ill.

Still another postgraduate course will be offered by the Philadelphia Dental Study Club on Wednesday, February 26, and Wednesday, March 5, 1958. This is listed as Operative Dentistry Under General Anesthesia for the Handicapped Patient. It will be presented by Dr. Morris Kelner and Associates at the Albert Einstein Medical Center (Northern Division) in Philadelphia.

This is a particular field that could use many such courses. Registration will be limited so anyone interested should contact Dr. Kelner at 1930 Chestnut Street, Philadelphia 3, Pa.

The New York University Orthodontic Society will celebrate its Twenty-fifth Anniversary by tendering a dinner-dance to honor Professor Samuel Hemley who is completing his Twenty-fifth year as Chairman of the Department of Orthodontics at New York University College of Dentistry. This testimonial honoring Dr. Samuel Hemley will be held in the Ball Room and Trianon Room of the Ambassador Hotel, Park Avenue and 51st Street, New York City, Saturday, March 1st, 1958, at 7 P.M.

The Application of the Rubber Dam in the Pre-School Child

PAUL STARKEY, D.D.S.

DR. JAMES MARK PRIME wrote[1] "Starting the daily use of the rubber dam is the beginning of wisdom. When the rubber dam comes thru the door, slipshod methods go out of the window. It marks the beginning of better dentistry. It is the first step in that long ascent to bigger and better things. Each day will see him laying aside the ordinary, and embracing the extraordinary. Those patients seeking the extraordinary will find him."

To the dentist who has become adept at using the rubber dam and is appreciative of its many advantages, it is hard to understand why it is not used more generally. His efforts to influence his colleagues to employ the rubber dam usually meet with arguments that are wholly unsound. Perhaps the resistance to its use may lie in the fact that when learning to use the dam in school, the student was required to use a technique that was impractical. Many times in school a student would be required to isolate four or five teeth in order to restore an occlusal lesion on one tooth, which could have been isolated by itself. This would be time consuming and to the operator who had not yet developed his digital dexterity, quite discouraging. Of course, the purpose in school of requiring this type of technique was to give the student more experience in handling the rubber dam, but in many cases, I feel, only tended to discourage the operator from using it except when absolutely required.

The operator who is not now using the rubber dam, and who has been out of school a few years, and has developed his digital dexterity and skill, should again give the rubber dam a try. He will certainly be amazed at the ease with which he will apply it, and at the pleasure he will derive from using it.

The author's practice is limited to dentistry for children and more than three-fourths of it is pre-school. The use of the rubber dam is especially indicated with this age group. These children have an abundant flow of saliva and a seemingly uncontrollable tongue and facial musculature. The restorations placed in their teeth are of small bulk and must be inserted in ideal dry conditions. This is the critical age in growth and development in which it becomes especially justifiable to perform pulpotomies, mumifying techniques, pulpectomies, and other pulp therapy in an effort to retain the primary molars prior to the eruption of the six year molars.

The author uses the rubber dam on virtually every patient from two and one half years of age on up. He finds it nearly impossible to do good dentistry for these young patients without the use of the rubber dam. The child relaxes under the dam and because of the lack of stimuli, the salivary glands slow down their secretion. The tongue seems to find a relaxed position and operative procedures progress much more rapidly. The writer feels that the time required for him to do operative work for the pre-school child is cut in half and that the quality of his

dentistry is greatly improved by using the rubber dam. The anatomy of the primary tooth is especially adaptable to the application of the dam. The constricted cervical makes it a "snap" to apply the dam and ligate these teeth.

The argument that the child will not accept the dam is not sound. The child is shown the dam, and told that this rubber sheet is placed over his teeth to keep them dry while we are filling them. We explain that a filling that is put in dry will last much longer. The child watches the hole being punched in the dam, and then he is asked to stick his finger thru the hole. He then understands how it goes over the tooth. He is then shown the clamp and the forcep and how they work. It is important that he understand what this forcep is and how it is used, else he might fear a tooth is to be extracted. Jinks[2] describes the dam to the child as a raincoat and we find this very effective. To the patient, an operative procedure carried out under a rubber dam is certainly a lot more pleasant experience than when he must have cotton rolls placed and replaced a number of times, have water squirted into his tooth, and have to spit a number of times. The plain fact is that the child patient accepts the rubber dam just as gracefully as he does any other operative procedure.

To write these things down for another to read means virtually nothing to the reader unless he is willing to try for himself and verify what is written. This paper is written for the express purpose of trying to influence those doing dentistry for the pre-school child to give the rubber dam a try if not already doing so. The paper will present as simple a technique as possible.

The armamentarium consists of a 5 x 5 sheet of rubber dam, dam punch, dam forceps, an Ivory #3 rubber dam clamp,

FIG. 1

and a Young's rubber dam frame. The rest of the instruments are normally on the dentist's bracket table. We will assume for the purposes of this paper that the pre-school child may include those with the recently erupted six year molars.

The simplest application of the rubber dam would be in the case of restoring an occlusal cavity on the lower second primary molar. Using the largest hole in the punch, a hole is placed in the proper

position on the dam. This may be located by placing a forefinger on the operator's side of the dam and carrying it to the mouth and touching the tooth to be isolated. (After a very little amount of experience with a dam the operator soon judges the position of the holes very accurately just by mentally visualizing what he is going to do.) Then the #3 clamp is placed in the hole and the operator places the forcep in the clamp. The assistant takes hold of the top two corners of the dam, (Fig. 1 a, b, c) and standing behind the patient, carries the dam towards the face as the operator carries the clamp towards the tooth from the front of the patient. He places the clamp on the tooth, releases the forcep, lays it on the bracket table and picks up the Young's rubber dam frame, and carries it to the patient's face. The assistant hooks the top two corners of the dam while the operator attaches the bottom two corners and the sides (Fig. 2). The operator, then using a right angle explorer picks up the dam from the wings of the clamp and flips it off. He can then adjust the clamp if necessary. If there is a tendency for the dam to dislodge while adjusting the clamp this can be overcome by using two fingers, one on each side of the clamp to hold the dam cervically while adjusting the clamp. This whole procedure requires less than 30 seconds and is a very fine technique for the rubber dam neophyte to begin with. He will be so amazed how easily he has applied the dam, at what a wonderful field he now has to work in, at the grace with which his patient has accepted the dam, and with the quality of dentistry that he can perform, that he will now be anxious to develop his techinique and skill with the dam.

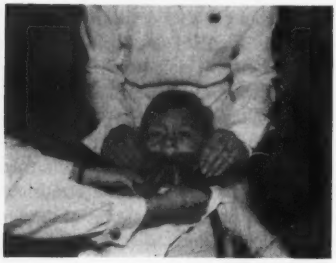

FIG. 2

The next application described is the one for which there is the greatest use. It is the isolation of both the first and second primary molars for the insertion of a mesio-occlusal amalgam on the second primary molar and a disto-occlusal amalgam on the first primary molar (Fig. 3). The dam is prepared in the same manner as the first application described with the addition of a hole mesial to the original hole for the reception of the first primary molar. The next to the largest hole in the punch is used. The dam is carried to the mouth in the same manner as the first application. The dam is flipped off the wings, as in the first application. Then using a long piece of dental floss the dam is carried down thru the contact point between the first and second primary molars. Then, holding the two ends of the dental floss taut and pulling down or cervically, a right angle explorer or spoon excavator is used to tuck the floss in the crevice linguo-cervically. This will tuck the floss in the crevice all the way around the neck of the tooth. Then the two ends of the floss are tied in a square knot. The clamp is then adjusted as perfectly as possible. The preparations, i.e., an MO on the second primary molar and a DO on the first are made (Fig. 3b). The author uses a regular Toffelmeir matrix retainer with a regular band, no dips. This band is placed on the second primary molar and the MO amalgam inserted. Usually, but not always, the

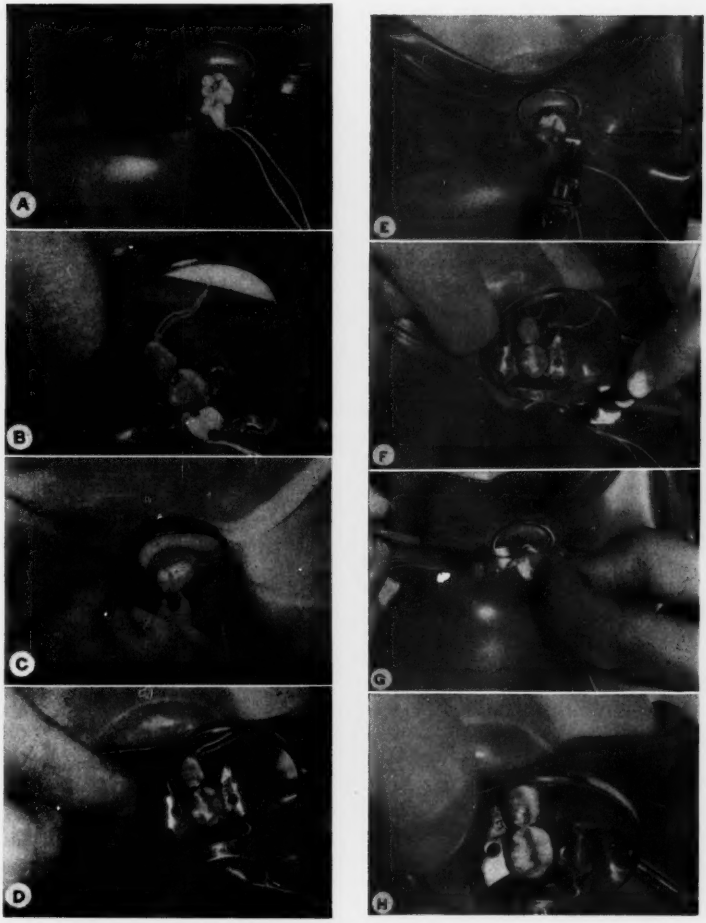

FIG. 3

matrix will conform well to the contours of the tooth, i.e., over the clamp as seen in Figure 3c. However, if it does not, after the matrix has been removed there is very adequate access to properly contour the mesial surface of the amalgam (Fig. 3d). In rare instances, it is sometimes necessary to remove the clamp in order to place the retainer. This can be done by holding the dam on with a finger on both sides of the clamp, removing the clamp, and then placing the retainer. After the amalgam is inserted the dam is again held while retainer is removed and

the clamp replaced. Then the matrix is placed on the first primary molar (Fig. 3e, f). After this amalgam has been inserted the flat end of a DPI plastic instrument is placed on the distal marginal ridge of the amalgam (Fig. 3g) to support it as the matrix band is removed. The amalgam on the first primary molar is then carved (Fig. 3h). Before the dam is removed the parents are cal ed into the operatory to be shown the work accomplished. The parent can readily recognize that this is quality work, and that the dentist certainly has the situation well under control, and that he has the cooperation of the child. The parent often remarks, "Is this something new? I've never seen it before. It sure helps doesn't it?" and the operator hastens to explain that this was first used around 1857. (3) Is it not strange that the layman readily recognizes the advantages of the dam and the profession as a whole apparently does not? It is rather hard to demonstrate to a parent what has been accomplished (Fig. 4) at a sitting, when it is necessary to place the head back on the rest, pick up a mirror, open the child's mouth (Fig. 4a), blow a blast of air at the restoration, and then quickly try to give the parent a glimpse of the work. With the dam in place, the parent need but glance in the mouth without a mirror to see what has been accomplished (Fig. 4b). It is the experience of the author that parents are very willing to compensate a dentist monetarily for his services when they can be demonstrated so clearly.

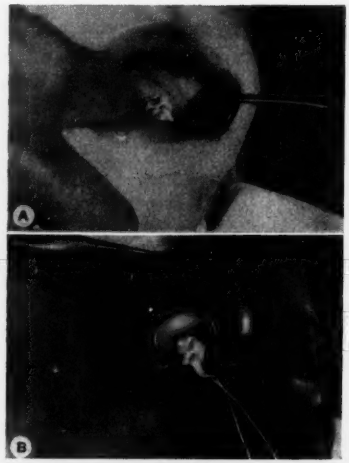

FIG. 4

FIG. 5

The next application to be described is the application of the dam to the primary anteriors (Fig. 5). The smallest hole in the punch is used to make the hole or holes in the dam, but in this instance, no clamp is used. The operator carries the dam to the mouth by grasping both sides of the dam near the top. As soon as he has slipped the dam over the teeth, his assistant takes the top two corners again. While the assistant holds the dam in this manner, the dentist, using floss (not tape), ligates each tooth to be isolated. Then the frame is applied in much the same manner as described in the first application. The operator retains the dam in the mouth by keeping the middle finger of his left hand touching the palate just lingual to the upper anteriors. If it is necessary for him to leave the patient, the assistant can retain the dam in the

same manner. If the child is old enough to help, he can even hold the dam on if it is necessary to leave him alone. He can do this by placing his thumb on the palate. The author has found that he has a very high degree of success with silicate fillings in primary anteriors when placed under a rubber dam, completely free from saliva and hemorrhage.

The next application to be described is one which can be varied throughout the mouth, and is a very handy technique. The example shown in Figure 6 would be in the case of the need to restore the second primary molar, when it is desirable to extract the first primary molar under the same local anesthetic and at the same sitting. A mandibular injection is given, and the first primary molar extracted. Then after a short wait for the initial hemorrhage to subside, a cotton pack or large pellet is placed in the socket. Then the dam is applied to the second primary molar and the restoration accomplished.

The last application to be described is one which is not used often but when used is extremely valuable. This consists of applying the dam to a lower six year molar which is not completely erupted, and still has a triangular piece of mucosa over the distal occlusal portion (Fig. 7a). The problem is frequently seen, in which the fissures are carious and the distal occlusal portion of the fissure is still covered by tissue. Using a #3 clamp, the dam is placed over this tooth. Only one hole need be used and only this tooth isolated. After the clamp is placed on the tooth, the dam is flipped off the wings. Then, using a right angle explorer, the dam is teased under the flap of tissue and down into the crevice distal to the tooth. The dam will draw the tissue off the occlusal surface so that a good clean and dry amalgam can be placed. I know of no other technique which will accomplish this particular restoration so well (Fig. 7b, c).

A great many very fine papers have

FIG. 6

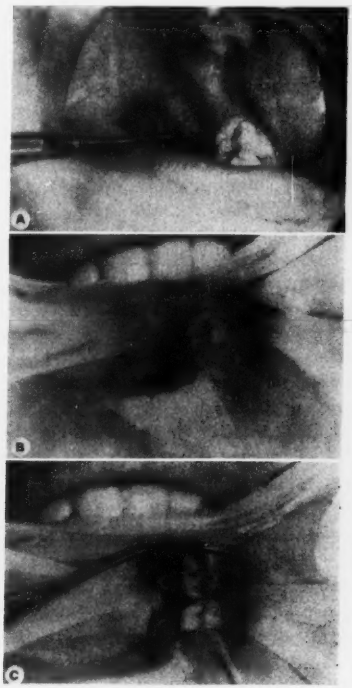

FIG. 7

been written over the years dealing with the rubber dam. This paper omits much of the technical details in the application of the dam which is so aptly described in these other papers. If the reader is interested to learn rubber dam technique, these papers listed in the bibliography along with others not listed, would serve as an excellent preparation for doing so.

If one is to read all these articles, he becomes acutely aware of the enthusiasm many men have for using the dam and of the awareness they have of what the rubber dam has done to improve the quality of their dentistry. He realizes that these men have written these articles in an attempt to interest their colleagues in using the dam, because they know what it has done for them.

If this paper influences but one dentist in his work for children, that he will again try the dam realizing what it will accomplish for him, it will have been worth the effort.

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BIBLIOGRAPHY

1. Prime, J. M.: Inconsistencies in Operative Dentistry, Journ. ADA&D. Cos. Vol. **24:** Jan. 1937.
2. Jinks, G. M.: Routine Use of Rubber Dam in Dentistry for Children Journ. CDA June 1953.
3. Dental Cosmos Vol. 26, June 1884.
4. Dinin, Alex: Rubber Dam, A Simple Procedure—Dental Items of Interest December 1951.
5. Renaud, J. A.: Must We Consider the Rubber Dam Old Fashioned, Useless and Inhuman? Journ. CDA June 1950 Vol. **16:**
6. Tocchini, John: Rubber Dam Application on the Primary Dentition, Journ. Calif. S. D. Ass. Vol **29:** May–June 1953.

Clinical Evaluation of Caries-Reducing Effect of a Dentifrice Containing 13% Carbamide and 3% Dibasic Ammonium Phosphate

PAUL VOGEL, D.D.S. AND WALTER HESS, M.D.*

A NUMBER of reports have appeared through approximately the past two decades on the cariostatic characteristics of prophylactic dentifrices. These products, often improperly referred to as "therapeutic" dentifrices, have encompassed a wide variety of ingredients. The "ammoniating" agents were perhaps the first general group to receive more than cursory attention.

Dentifrices containing ammonium compounds and/or urea are intended to interfere with the acidic disintegration of calcified tooth structure by virtue of their capacity to neutralize acids before erosion occurs. There have been some reports[1, 2] that lactobacillus inhibition is related to the mechanism of action but this theory has been disputed.[3] In products containing high concentrations of carbamide, there is probably a mechanism which inhibits acid production from glycolytic enzymes.[4]

Many studies on the in vitro activity and chemical characteristics of ammoniating agents have been made but these can do no more than suggest a mechanism of action. Reports on the clinical utility of ammoniated agents are also rather numerous and it was considered advisable to carefully examine this background information.

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Low-Carbamide Dentifrice Formulas

With 5% dibasic ammonium phosphate and 3% carbamide in a toothpowder, Kerr and Kesel[5] observed a reduction in caries incidence of about 12 per cent among 179 ten and eleven year old school children after 2 years as compared to a control group of 160 children who used a similar dentifrice without the active ingredients. Davies and King[6] reported no reduction in caries among 171 older children and young adults using the same concentration of compounds described above in a toothpowder. Observations were made over a six months period with 168 subjects serving as controls. Backer-Dirks, Winkler and Van Aken[7] paired 166 ten to fourteen year old children and followed caries increments for 18 months. The experimental group using a toothpaste containing 5 per cent dibasic ammonium phosphate and 3 per cent urea was compared to a matched control group using a similar formula without the ammoniated agents. A 5.7 per cent reduction in surfaces of teeth erupting during the study was observed in the experimental group of 83 children but there was an 0.5 per cent comparative caries increase in teeth non-carious at the start of the program.

On the basis of three published reports, it appears that the use of 5 per cent dibasic ammonium phosphate and 3 per cent carbamide in a dentifrice has only

slight value in the prevention of caries development.

Dentifrice Containing Intermediate Concentration of Carbamide Plus Urease

The approach of combining a moderate concentration of carbamide (12 per cent) and 1 per cent of the enzyme urease in a toothpowder base with polishing agents and flavor has been evaluated for clinical merit by Hawes and Bibby.[8] The function of the urease in the formulation was presumably to supplement that occurring in the saliva of about 90 per cent of the population and to provide for it in the small minority in whose saliva this enzyme is lacking or shows great daily fluctuation. The clinical evaluation was conducted with a control group of 177 seven to thirteen year old children and 196 test subjects in a similar age grouping. Assessment of the results indicated a 13 per cent reduction in caries incidence in DF primary teeth, a 12 per cent increase in DF permanent teeth, and a 7.5 per cent increase in all DF teeth among children in the test group as compared to the controls.

The authors concluded that the test dentifrice had failed to show any merit in decreasing caries incidence and questioned the validity of claims of caries reduction by all ammonium ion dentifrices.

High-Carbamide Dentifrice Formulas

Henschel and Lieber[9, 10] have investigated the clinical merit of a toothpowder formula containing 22.5 per cent of carbamide and 5 per cent dibasic ammonium phosphate among patients in private practice. In their first report,[9] among 100 patients who changed from cosmetic dentifrice use for 7.8 years to a 22.5 per cent urea, 5 per cent dibasic ammonium phosphate powder dentifrice for 2.9 years, there was a 35.2 per cent reduction in caries activity from the autocontrol period. When compared to a concurrent control group of 50 patients, the test subjects had 37.5 per cent less caries activity.

In a subsequent report, the same authors[10] found that 110 patients using the high-urea ammoniated dentifrice for a period of 4 years had 43.6 per cent fewer caries lesions increment than a control group of 75 patients, statistically similar except for the type of dentifrice used. It was pointed out that the high-urea ammoniated dentifrice probably exerted its maximum effect when used before, rather than after, meals.

In an interim report, Lefkowitz and Venti[11] found that 89 institutionalized children on a high-urea ammoniated toothpaste exhibited a reduction in caries as compared to 31 control children using a cosmetic dentifrice. After 18 months, the reduction varied between 50 and 60 per cent depending on the method of calculation, with the most pronounced effect apparent in previously non-carious permanent teeth.

In two reports on pre-school children, Gale[12, 13] found a 39.6 per cent decrease in caries lesions among 30 test subjects after one year as compared to the same number of control subjects. The test subjects were supplied with "Amm-i-dent" toothpowder for twice daily in-school brushing while controls were allowed to use dentifrices of their own choice. After two years in this supervised program, the difference in caries attack was 32.8 per cent in favor of the high-urea ammoniated group.

Cohen and Donzanti[14] conducted a controlled two-year brushing program among 306 nine to thirteen year old Philadelphia school children. After one year there was a 22.9 per cent decrease in

caries incidence in the children using a high-urea toothpaste as compared to those using a similar composition lacking the prophylactic ingredients. After two years, the percentage difference was 25.2 among 169 test subjects as compared to 137 controls. Children in this program brushed their teeth twice daily during school hours under supervision and were provided with additional quantities of dentifrice for home use.

The above observations on the high-urea ammoniated dentifrice appear to indicate that it may be capable of reducing caries activity from about 25 to 40 per cent.

Purpose of the Investigation and Composition of Agent Chosen

The encouraging results on the high-urea dentifrice as reported above made it seem to be the agent of choice for our own clinical investigations. A commercial toothpaste* containing 13 per cent carbamide (synthetic urea) and 3 per cent dibasic ammonium phosphate was employed as the test dentifrice in our studies while control subjects used a non-ammoniated dentifrice. The concentration of active ingredients in the test paste dentifrice had been selected to give oral levels comparable to those obtained with a 22.5 per cent urea, 5 per cent ammonium phosphate toothpowder.

The benefits to be derived from any simple method of caries prevention are obvious and require no elaboration. It was our intention to investigate the reliability of the favorable reports as related to our own needs in Swiss school children by an independent assessment of the reported, and as yet uncontradicted, clinical merits of the high-urea dentifrice.

* Amm-i-dent Toothpaste, supplied by Parcos A. G., Switz.

Method of Clinical Testing

With the aid and cooperation of the Zurich school dental clinic and especially that of Dr. Wettstein of the Feldstrasse Clinic, a number of sixth grade classes from nearby schools were made available to us. Teachers of the various classes were approached to explain to them the purpose and procedure of the test and to obtain from them their assurances of active support. Classroom orientation programs were held and the children enlightened as to their part in the intended program. Bite-wings were taken in the lateral region and the children prepared for initial examination. A probe and mouth mirror were used for clinical evaluation and x-rays taken as required. Clinical record charts were prepared for each subject and prior to the start of the test program, carious areas in all children were repaired so that all subjects were caries-free.

Eight sixth-grade classes were utilized. The children in four of these were given the test dentifrice in coded tubes while the other four were retained as controls and issued a cosmetic dentifrice, also in coded tubes. At no time until the completion of the program did the children, teachers or investigators know which of the dentifrices was test and which was control. This double-blind technique is required to eliminate conscious or subconscious bias in diligence or regularity of brushing or diagnostic errors upon examination. All children were issued toothbrushes; additional supplies could be obtained upon request. Periodic but unannounced school visits were made by one of us (P. V.) to remind the children of the necessity of good oral hygiene, to make spot checks of tooth cleanliness and to reawaken possible flagging interest. Subjects were instructed to brush their teeth for two minutes morning and

night, and classroom instructions were given in proper brushing techniques, although teeth were not brushed in school during the test period. During the program, individual consumption of dentifrice was checked by clinical records and negligent children admonished.

Eight months after the start of the program and again, six months after that, subjects were clinically re-examined with mirror, probe and x-rays. Considerable attrition of numbers of subjects was found at the two later examinations, primarily because of relocation of families and the removal of children to other schools. Whenever possible, individual subjects no longer with their previous groups were followed and re-examined. At each of the subsequent examinations, carious areas were repaired after having been recorded. In effect, then, the program was conducted at all times with only sound teeth, except for those which decayed between examination periods. No attempt was made to evaluate severity or extent of lesions during examinations and only the numbers of lesions were recorded. It might be noted, however, that no severe or rampant degradation of tooth structure occurred in any of the children during the 14 months of test.

Results and Discussion

The increment in new caries lesions for the two groups are noted in Table 1. It can be observed that the use of the high urea dentifrice reduced caries activity by about 22 per cent during the first part of the program and about 34 per cent during the latter part with an overall reduction during the entire test of about 28 per cent. T values[15] demonstrate that these decrements are statistically significant.

The distribution of caries lesions in the two groups is demonstrated in Table 2. If the groups are arbitrarily divided into those with low, moderate and high caries activity, Table 3 demonstrates that a higher percentage of children using the high urea dentifrice could be placed in the low caries activity group while the percentage of these children is lower in the high caries activity group. These distributions might be anticipated since a significant difference between test groups by any one method of statistical analysis is usually apparent by any other method. The mechanism of caries reduction by use of the test dentifrice is not apparent in these studies nor was any attempt made to run corollary bacterial tests, pH studies, or other possible methods of es-

TABLE 1

Caries Increments During Test

Formula	No. of Pupils	No. of Permanent Teeth	No. of Lesions 0-8 mos	Attack Rate	SD	Per Cent Reduction	New Lesions 8-14 mos	Attack Rate	SD	Per Cent Reduction	Total New Lesions	Attack Rate	SD	Per Cent Reduction
Control dentifrice	70	1744	119	1.70	±1.71	—	127	1.81	±1.65	—	246	3.52	±2.55	—
High urea dentifrice	70	1696	93	1.33	±1.57	−21.8*	84	1.20	±1.46	−33.7†	177	2.53	±2.05	−28.1‡

* T = 1.2, P = > .05.
† T = 2.3, P = < .01.
‡ T = 2.1, P = < .05.

tablishing the route through which the product exerted its effect. The suggestion that a high urea concentration may inhibit plaque acid production for many hours after use[16] would appear to offer a possible rational explanation of the observed results.

It is difficult to understand, however, what part the dibasic ammonium phosphate may play in the caries preventive effect of the test dentifrice. This agent has been used in products containing both low and high concentrations of urea. Clinical investigations on the two types had indicated that the low-urea type has been relatively ineffective in reducing caries[5-7] while the high-urea formula has demonstrated a consistent cariostatic effectiveness in six previous studies[9-14] and in ours. In our opinion, this difference in activity can only be ascribed to the difference in urea content of the dentifrices used. It would be interesting to observe the clinical activity of a dentifrice formula prepared with a high concentration of urea alone or possibly with some other adjunctive agent such as a glycolytic enzyme inhibitor, a fluoride, or an agent which physically occludes enamel surfaces.

Diligence of toothbrushing might well be considered to be a contributing factor in the observed results. In this study, however, there was no evidence that either group was more conscientious in this respect than the other, since both dentifrices were similar in taste and appearance and subjects were not aware as to whether they were using the test or control product.

TABLE 2

Distribution of Caries Lesions

No. of Lesions	No. of Children 0-8 months		No. of Children 8-14 months		No. of Children Total	
	Control	High urea	Control	High urea	Control	High urea
0	23	29	23	29	11	12
1	16	15	9	18	10	14
2	11	15	14	13	9	15
3	12	5	11	6	8	8
4	4	3	9	1	12	11
5	1	0	3	1	6	5
6	1	2	1	1	2	0
7	2	1	0	1	5	3
8 or more	—	—	—	—	7	2
Total	70	70	70	70	70	70

Summary

Previous studies have demonstrated that of the three types of ammoniated dentifrices clinically investigated, only the high-urea formula has shown a consistent result in caries reduction.

In a further study on 140 sixth grade

TABLE 3

Distribution of Caries Lesions by Low, Moderate and High Caries Activity

Group	No. of Children 0-8 months		No. of Children 8-14 months		No. of Children Total	
	Control	High urea	Control	High urea	Control	High urea
Low caries activity (0-1 lesions)	39(55.7%)	44(62.9%)	32(45.7%)	47(67.2%)	21(30.0%)	26(37.1%)
Moderate caries activity (2-3 lesions)	23(32.9%)	20(28.5%)	25(35.7%)	19(27.1%)	17(24.3%)	23(32.9%)
High caries activity (4 or more lesions)	8(11.4%)	6(8.6%)	13(18.6%)	4(5.7%)	32(45.7%)	21(30.0%)
Total	70	70	70	70	70	70

"caries-free" school children over a 14 months test period, the high-urea dentifrice reduced caries activity about 28 per cent, a result in keeping with the findings of other investigators.

It has been theorized that dibasic ammonium phosphate is a relatively unimportant dentifrice ingredient in the mechanism of caries reduction.

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REFERENCES

1. Kesel, R. G., O'Donnell, J. F., Kirch, E. R. and Wach, E. C.: "The Biological Production and Therapeutic Use of Ammonia in the Oral Cavity in Relation to Dental Caries Prevention" J. Am. Dent. A. **33:** 695, 1946.
2. Kesel, R. G., O'Donnell, J. F., Kirch, E. R. and Wach, E. C.: "Ammonia Production in the Oral Cavity and the Use of Ammonium Salts for the Control of Dental Caries" Am. J. Orthodont. and Oral Surg. **33:** 68, 1947.
3. Kirchheimer, W. F. and Douglas, H. C.: "The Failure of Ammonium Ions to Inhibit the Growth of Oral Lactobacilli" J. Dent. Res. **29:** 320, 1950.
4. Stephan, R. M.: "Intra-Oral Hydrogen-Ion Concentrations Associated with Dental Caries Activity" J. Dent. Res. **23:** 257, 1944.
5. Kerr, D. W. and Kesel, R. G.: "Two-year Caries Control Study Utilising Oral Hygiene and an Ammoniated Dentifrice" J. Am. Dent. A. **42:** 180, 1951.
6. Davies, G. N. and King, R. M.: "The Effectiveness of an Ammonium Ion Toothpowder in the Control of Dental Caries" J. Dent. Res. **30:** 645, 1951.
7. Backer Dirks, O., Winkler, K. C. and Van Aken, J.: "A Reproducible Method for Caries Evaluation III Test in a Therapeutic Experiment with an Ammoniated Dentifrice" J. Dent. Res. **32:** 18, 1953.
8. Hawes, R. R. and Bibby, B. G.: "Evaluation of a Dentifrice Containing Carbamide and Urease" J. Am. Dent. A. **46:** 280, 1953
9. Henschel, C. J. and Lieber, L.: "Caries Incidence Reduction by Unsupervised Use of 27.5 Per Cent Ammonium Therapy Dentifrice" J. Dent. Res. **28:** 248, 1949.
10. Henschel, C. J. and Lieber, L.: "High-Urea Ammoniated Dentifrice: Caries Reduction Through Four Years' Home Use" Oral Surg., Oral Med., and Oral Path. **5:** 155, 1952.
11. Lefkowitz, W. and Venti, V. I.: "A Preliminary Clinical Report on Caries Control with a High Urea Ammoniated Dentifrice" Oral Surg., Oral Med.. and Oral Path. **4:** 1576, 1951.
12. Gale, J. A.: "Interim Report on a Controlled Experiment on Pre-School Children with an Ammoniated Dentifrice" Dent. Rec. **71:** 15, 1951.
13. Gale, J. A.: "Final Report on a Controlled Experiment on Pre-School Children with an Ammoniated Dentifrice" Dent. Rec. **71:** 151, 1951.
14. Cohen, A. and Dozanti, A.: "Two Year Clinical Study of Caries Control with High-Urea Ammoniated Dentifrice" J. Am. Dent. A. **49:** 185, 1954.
15. Dixon, W. J. and Massey, F. J.: "Introduction to Statistical Analysis" McGraw-Hill, New York, 1951.
16. Lefkowitz, W. J. and Singer, A. J.: "The Effect o Urea and Diammonium Phosphate on the pH of th Tooth Surface" N. Y. St. Dent. J. **17:** 159, 1951.

Oral, Dental and Orthodontic Problems of Speech in Cerebral Palsy*

Shulamith Kastein†

IN ORDER to discuss oral, dental and orthodontic problems as they affect speech in cerebral palsy, it is necessary to consider the mouth, the organ of articulation, in its proper perspective to the total process of verbal communication.

Since the individual—child or adult—with cerebral palsy is first and foremost a human being, his language and speech development and functions may be deficient or absent as a result of any one or several of the numerous causes, organic, structural or functional, observed in children and adults without cerebral palsy. He may also have problems which are the direct result of his cerebral palsy condition. It is important, therefore, not to allow the clinically obvious, the label—be it cerebral palsy, convulsive disorders, cleft palate, hearing loss, etc.—to deflect our judgment and prevent or delay thorough investigation of each case to determine the specific causative and contributory factors underlying the impaired or absent language and speech functions. It is only in this frame of reference that cause and effect of oral, dental and orthodontic problems interfering with speech development, will be properly determined and understood.

In order to develop and maintain normal speech, the child needs sufficiently intact peripheral sense organs of hearing, sight and touch to perceive stimuli from the outside world. He further needs sufficiently intact cortical functions to interpret what he hears, sees and feels, and to comprehend and use symbols. After these symbols—auditory, visual or tactile—have been perceived and interpreted, proper associations have to be made through past experience and learning in order to choose and execute the adequate response. To do this appropriately and within the proper span of time, a certain degree of intelligence is essential. Moreover, since speech is a function of communication, the child must be sufficiently adjusted emotionally to want to communicate and live in a psychological climate conducive to communication. A discussion of the complex processes of verbal communication would be incomplete without brief reference at least to psychomotor functions which, on a cortical level, are responsible for the ability to focus on a stimulus presented and to perceive it as a whole (a gestalt) against the background of unstructured stimuli, be they in the field of hearing, sight or touch.

Thus, verbal expression and response as we observe it clinically, depends upon the peripheral, neural, central, as well as psychomotor, intellectual and emotional integrity of the organism.

Verbal speech, in this hierarchy of functions is most directly determined by the ability and desire to comprehend and use words as a means of communication; narrowing the concept further, it is the

* Presented at the Annual Scientific Meeting of the Dental Guidance Council for Cerebral Palsy in New York, 1956.

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motor function proper, which in turn depends upon the integrity of the mechanism of phonation and articulation.

Speech, more specifically, depends upon the coordination and rhythmic movements of muscles which have been used and developed by the normal infant for such primary functions as breathing, sucking, swallowing and chewing. Articulate speech, therefore, is based upon a well coordinated breathing mechanism to supply and control the flow of breath; adequate laryngeal functions to produce and control volume, pitch and tone of voice adequately; patent oral structures to direct the air stream and to serve as resonators as well as articulators. The articulation of both vowel and consonant sounds is based in turn on the degree of precision and speed with which the soft palate, the tongue, the lips and the jaws can be moved and their movements coordinated to maintain rhythm, modulation, sequence and blends of sounds in connected speech.

If the lips cannot be approximated, be it because of lack of adequate muscle function or because of large, protruding teeth, the lip sounds m, b, and p will be affected. If the tongue does not have sufficient motility to reach the upper gum ridge, the tongue palate sounds, d, t, l, and n may be defective or missing. If the jaws cannot be approximated, or if malocclusion is present, the sibilant sounds, s, sh, ch, j, g and z may be produced faultily or not at all. Moreover, if the rate of movement is abnormal (diadachokinesis) or the range of movements limited, sound blends, the sequence of sounds and words, rhythm, will be disrupted. These are dysfunctions found in various disorders of speech and are not peculiar to cerebral palsy only, nor are they found in all cases of cerebral palsy. It is obvious, however, that in cerebral palsy, where neuro-motor functions have been impaired, these difficulties will play a considerable role.

It is less obvious, though equally important, for a thorough differential diagnostic evaluation from a speech pathological and therefore an oral, dental and orthodontic point of view, to realize, that in the cerebral palsy as well as in the non-cerebral palsy population, the total personality must be considered and his reactions to whatever limitations he encounters be taken into account. The child is not only the product of genetic, hereditary and environmental factors; he is also endowed with his unique personality traits which will determine his reactions to limitations as part of his reactions to life itself. This applies not only to his attitudes, his zest for living and learning, his reaching out toward the world around him, it also applies to his awareness of what happens within him, his proprioceptive sense; his ability to compensate for lacking or impaired functions by bringing into play muscles which otherwise might not serve the same purpose. Consequently, structural impairments, oral or otherwise, limited range and motility of muscles of articulation, malocclusion will, unless they are extreme, have different effects on different individuals. They will be compensated for in different ways and cause different degrees of impairment.

With this in mind, let us examine the oral, dental and orthodontic problems of speech in the cerebral palsy population. Although it is doubtful whether there are appreciably more such problems in cerebral palsy, compared to the rest of the population in a general speech clinic, in the frame of reference of the total process of language and speech development, a shift of causative and contributory factors influencing both, the degree of dysfunction as well as response to

treatment, may occur in the group with cerebral palsy because of the higher incidence of convulsive disorders, mental retardation, perceptual disturbances and behavior problems in this etiological group. Hence oral, dental and orthodontic problems may be rendered more severe, and less conducive to correction.

Generally speaking, irrespective of the type of cerebral palsy, the following oral, dental and orthodontic problems must be considered as adversely influencing the development of speech.

Impaired development of structures, such as high, narrow palatal arches; over- or under-developed maxilla or mandible; delayed or defective eruption of teeth, which may be highly susceptible to decay. Here, difficulty in treatment because of the cerebral palsy condition or lack of professional willingness to cope with it, may play a role. Poor muscle function, causing difficulty in sucking, swallowing and chewing may interfere with the use of these muscles for articulation. Malocclusion combined with tongue thrust and drooling is frequently found. This may be due to faulty muscle actions preventing closure of the jaws, it may, however, be due to mental retardation or may be connected with infantile patterns as part of emotional problems, aggravated by thumb or finger sucking; or else, emotional illness and persistent biting of objects and hands may further interfere with proper development and growth of jaws and teeth. Once protrusion of teeth is established, the poorly innervated lips may not be able to exert enough pressure to approximate and another stimulus to keep the mouth closed will be lost, and speech further impaired. Or, if an open bite has developed, the hypotonic tongue may not be able to resist or the hypertonic tongue may be thrust through the opening, increasing the difficulty and starting a vicious circle. Again, speech will suffer, drooling will be increased. Drooling is equally troubling to the dentist and the speech therapist, not to speak of the patient. Apparently, various factors contribute to the condition. Difficulty in swallowing, head position (drooping) due to weak neck muscles, open mouth, as well as tongue thrust all contribute, if only from a mechanical point of view. Lack of sensitivity of the skin to moisture may play a role in some cases, retardation and lack of awareness and conscious control in others.

The grinding of teeth is another factor, frequently observed in children with cerebral palsy; again, the causes may vary: while in some cases faulty muscle function may be the reason, as in tension athetosis, in others retardation or emotional disturbance may be the cause, as is the case in children who do not have cerebral palsy.

Since the incidence of convulsive disorders is high among the cerebral palsy population, swollen gums as a side-effect of medication (dilantin) may occasionally create problems.

Related to the type of cerebral palsy, the more specific oral, dental and orthodontic impairments affecting speech development, may be grouped as follows:

In the predominantly spastic:
- abnormal movements of facial muscles and the muscles of mastication and glutition
- maxillary or mandibular overdevelopment
- mandibular slip
- mandibular shift
- stretch reflex
- drooling

In the predominantly athetoid:
- high palatal arches
- involuntary movements (grimacing)
- teeth grinding

abnormal tongue movements
drooling
poor sucking, swallowing and chewing

In the predominantly ataxic:

poor proprioceptive sensations
lack of positional sensation
tongue protrusion and open bite
ankyloglossia (tongue tie)
slow movements, irregular rhythm and abnormal diadachokinetic rate
grimacing
drooling

Whether organic, structural or functional, the degree to which any one impairment or deviation of function will hinder the development of speech in any individual case depends on the distribution and balance of all factors involved, such as perception, intellect, emotional adjustment as well as neuromotor functions. Usually, oral, dental or orthodontic problems do not prevent language from development, although they may cause defective speech. The team approach of the various disciplines is therefore the only safeguard to determine all the causative and contributory factors in the ack or impaired function of communication and the team approach to therapy the only way of assuring adequate training and rehabilitation.

To the individual, and particularly the child with multiple handicaps, each additional impairment, no matter how slight, becomes more handicapping because of its multiplicity and will aggravate other existing conditions, creating a very vicious circle.

The guiding philosophy, therefore, should be one of early diagnosis and early training, preventive as well as rehabilitative. Observation of the child as soon as cerebral palsy is suspected or established, to detect delay or dysfunctions when they occur, particularly sucking, swallowing and chewing, language and speech. Differential diagnostic evaluation of these functions at the time or soon after the time when they should normally develop, that is, at the physiological optimum time.

If we could establish closer research and clinical collaboration with the dentist and orthodontist we might learn to recognize and understand better some of the causes and effects and be able to prevent their progression.

Erroneous Concepts in the Dental Treatment of Children with Cerebral Palsy

JERRY J. ADELSON, D.D.S.*

THERE has been an increasing awareness on the part of the profession in the past few years as to the importance of dental treatment of children with cerebral palsy. When any new interest is aroused in a form of therapy, the possibility arises of too hasty acceptance of a specific mode of treatment or drug regime. In addition, with increasing publicity of the new interest, mistaken generalities tend to originate. This has been particularly true in the field of dental treatment of children with cerebral palsy.

For example, misinterpretation of the neuromuscular disorders and reactions of the child with cerebral palsy has led in many cases to the overall misdiagnosis of these children as unmanageable. Many children with cerebral palsy will demonstrate involuntary motions and lack of coordination which may be misinterpreted as inability to cooperate.

Spastic children may present involuntary facial contortions which may give the impression that overfearfulness is present. Athetoid movements may be writhing, twisting, or patternless which may be taken as lack of cooperation. When the muscles of the throat, tongue, and diaphragm are seriously involved, as is occasionally seen, speech may be unintelligible and the patient may drool and seem intellectually retarded. Inability to communicate on the part of the patient may not be an indication of lack of comprehension. It may be a specific neuromuscular damage to the speech centers. This *same* understanding must be accorded to those children who have specific neuromuscular disorders of the hearing apparatus.

In other words, the practitioner should not relegate the child with uncoordinated movements and lack of communication or hearing to the ranks of the unmanageable patient.

Ideally, the dentist, via a history and consultations should obtain information on the medical, psychological, educational, and family backgrounds of the specific child. With this information, the practitioner should be capable of dealing with the majority of these children.

In recent years, there has been ever increasing and frequently premature publicity given to newly synthesized relaxant drugs; published articles drawing conclusions frcm research done on an inconclusive number of cases. The search for an ideal muscle relaxant for use with these children has been going on for a long time. The objective in this research is to locate a medication which can be administered, and provide a degree of relaxation so that dental treatment can be performed without the use of the supports which are sometimes required. This medication should, of course, have a minimum of toxicity and untoward side effects, while providing adequate muscle relaxation.

It is understandable that under the stress of hurried daily practice we may seek aids and short cuts in making our

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work easier, but caution must be used, particularly with medications in this field, until adequate research has been completed and full results have been accepted.

As an example of hasty acceptance of a medication, some time ago most practitioners were deluged by advertisements advocating the use of mephenesin for muscular relaxation and tranquillization of difficult patients. At the same time, some research was published on the use of mephenesin in the dental treatment of children with cerebral palsy. Nowhere in this research was there found to be any mention of severe side effects or possible toxicity. Fairly recent evidence has demonstrated two effects which specifically may be of danger when mephenesin is indiscriminately used with these children with cerebral palsy. Average therapeutic doses of mephenesin have been found to have a specific action in patients who have difficulty in swallowing (or dysphagia). Mephenesin has demonstrated the ability to obtund the pharyngeal reflex in these individuals. This has important application in the dental treatment of children with cerebral palsy, some of whom are dysphagic. This obtundation of the pharyngeal reflex makes the aspiration of tooth debris and pieces of filling material a simple matter. Not so simple are the consequences of this aspiration, namely lung abscess and pneumonitis. It has also been shown that mephenesin when used with barbiturates causes a profound respiratory depression. It should be remembered that an occasional child with cerebral palsy is encountered who is on a daily barbiturate regime.

Although, mephenesin has been given as an example, the same note of caution in use should be applied to the newer tranquillizing agents such as reserpine, chlorpromazine, and the meprobamates. Whereas the use of these drugs is increasing, their final value remains to be established and, until then, especially because their toxicity has not been fully explored, they should be used with considerable circumspection. The dental profession should give impetus to scientific experimentation and evaluation of these and other drugs in order to determine the actual place they may occupy.

With an adequate knowledge of the background of the child with cerebral palsy and an understanding of his specific disability, the majority of these children can be treated under fairly routine conditions. There are, however, a minority of children within this area who do require the use of restorative dentistry procedures with general anesthesia. It has been found that 2½% of all of the children with cerebral palsy seen at the Cerebral Palsy Dental Clinic at Columbia University have been found to require the use of general anesthesia. It should also be pointed out that these 2½% have in the main demonstrated severe associated disabilities such as low level mental retardation and emotional disturbances.

Within this specific area, restorative dentistry with general anesthesia does present the finest method and the most non-traumatic mode of treatment. With a team approach, utilizing qualified and experienced personnel complete dental diagnosis and treatment consisting of pre- and post operative radiographs, pulp therapy and restorations may be performed on a high standard in one or possibly two sessions. This enables these children, who cannot be treated by any other means, to receive excellent dental care without any adverse psychological effects.

However, just as the indiscriminate routine use of drugs should be cautioned against, so should the role of restorative dentistry with general anesthesia be realistically evaluated.

To sum up, the ability or willingness of the child to cooperate should not be judged on the child's movements, appearance, or communication. And, technics such as drug therapy and general anesthesia have their place in the dental treatment of children with cerebral palsy, but should not be relied upon or accepted as routine procedures to be used in all of these children.

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New York City 19.

BIBLIOGRAPHY

ROSENSTEIN, S. N., "Cerebral Palsy Dental Program at Columbia University, Columni, 12: 13, October 1955.

Morphology of the Root Canals of the Primary Molar Teeth*

EDWIN D. HIBBARD, D.D.S., M.S.† AND RALPH L. IRELAND, D.D.S., M.S.

Editor's note:

Ed. Hibbard, whose scholarly paper is presented herewith, is a graduate of the University of Nebraska School of Dentistry. After a stint in the Navy he returned to Nebraska for grduate work in pedodontics, leading to his M.S. degree. After a short time in practice at Lincoln and York, Nebraska, he agreed to take over the pedodontic department at Emory University, where he has been since June 1957.

Deer hunting and fishing are Ed's hobbies, and with much help from his wife and two children, he has managed to get together one pair of deerskin gloves from a kill of his own!

A past president of the Nebraska Unit, Ed is an interested and active member of A.S.D.C., and we trust he will find much to do in our Atlanta, Georgia Unit.

A.E.S.

NUMEROUS reports may be found in the literature describing the shape and form of the root canals of the permanent teeth,[8, 9, 10, 18] but with the exception of Zurcher,[1] no one has made a comprehensive study of the morphology of the root canals of the primary teeth. The few authors who have described the root canals of these teeth have done so only in relationship to the external form of the root surface. Such descriptions, of course, are not entirely valid.

It is also interesting that the articles which have been written,[2, 3, 4, 5, 6, 7] describing technics for the treatment and filling of the root canals of putrescent primary teeth did not include a description of the morphology of the root canals which were to be treated and filled. It would seem imperative that a dentist have a thorough knowledge of the anatomy of the root canals before attempting root canal surgery and therapy.

The only comprehensive, scientific study describing the morphology of the root canals of the primary teeth was reported by Zurcher[1] in 1925. This investigator used red rubber vulcanite for duplicating the form and shape of the root canals, and an ordinary denture flask was employed for processing the vulcanite rubber into the canals. Considering the materials and equipment which were available at that time and used by Zurcher, the results he obtained were excellent.

Pilot studies by Ireland indicated that by the use of the newer and more recently developed materials and equipment, a more accurate and exact reproduction of the root canals could be obtained than those produced by Zurcher.

Likewise, in view of recent studies on the formation of secondary dentin in primary teeth,[11, 12, 13, 19] it may be assumed

* The data presented in this paper were taken from a thesis submitted by Edwin D. Hibbard in partial fulfillment of the requirements for the degree of Master of Science in Dentistry in the Graduate College of the University of Nebraska.

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that secondary dentin formation in the root canals of these teeth could produce changes heretofore not investigated. Zurcher[1] stated that secondary dentin formation produced changes in the shape of the root canals of the primary teeth, but he did not substantiate this statement. Because the stimulation of root resorption may be a factor in secondary dentin formation and because Zurcher[1] did not use teeth in his study which showed evidence of root resorption, the vulcanite specimens of the root canals Zurcher produced may not have been representative specimens of the root canals of the primary teeth.

Methods and Materials

The teeth used in this study were collected from dentists from all parts of the United States. Some of the teeth showed no evidence of root resorption while others showed varying amounts of root resorption. It was believed that duplicating the root canals from such a selection of teeth would present a more representative picture of the changes, if any, which may take place as the roots of the primary molars mature and the resorptive process progresses.

Polymethyl methacrylate resin, colored with a red pigment (cadmium red), was used for duplicating the root canals of the prepared teeth. The polymethyl methacrylate resin, because of its chemical and physical properties, lends itself more readily to handling and processing than does the vulcanite rubber.

For injecting and processing the acrylic resin in the pulp canals of the prepared primary molars, the injector type flask was employed and gave excellent results (Fig. 1). The injector flask is far superior to the ordinary denture flask in that the acrylic resin is subjected to a continuous pressure, whereas in the ordinary denture flask, pressure ceases when the two halves of the flask are brought in contact. This sustained pressure on the resin assures a complete and accurate duplication of the minute anatomical structures of the root canals, and assures a dense uniform specimen free from porosity or void areas.

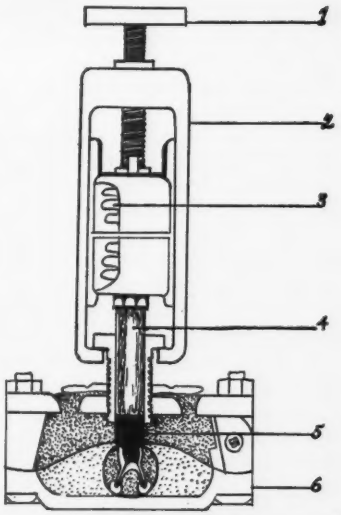

Fig. 1. 1) Wing screw 2) Injector 3) Coil spring 4) Piston 5) Cylinder reservoir 6) Flask.

Zurcher experienced an approximate 25% failure in his duplications due to the formation of air bubbles in the vulcanite.[1] Without exception, no specimens in this investigation revealed failure due to air bubbles, voids, or porosity.

As suggested by Zurcher,[1] 3% commercial hydrogen peroxide was found to remove the contents of the pulp canals in two to three weeks. The pulp chambers of the teeth were exposed and the teeth placed in a 3% hydrogen peroxide solution and kept at room temperature ten to fourteen days. It was found that the peroxide solution lost its potency after

several days and by changing the solution every three to four days, the cleansing of the canals was accelerated.

After the pulp tissue had been completely removed by the action of the peroxide, the teeth were thoroughly washed in running water and placed in absolute alcohol for twenty-four to forty-eight hours, after which they were thoroughly dried. The occlusal opening of the teeth and the apex of each root was covered with pink base plate wax to prevent plaster of Paris from entering into the pulp chamber and pulp canals. The teeth, with the exception of the areas covered by pink wax, were then embedded in a small portion of plaster of Paris. After the plaster hardened, the wax covering the apex of each root was melted away with boiling water. A thick heavy mix of plaster was then gently placed over the apex of each root, care being taken to prevent the plaster from flowing into the void areas around the apices. The teeth, with the exception of the wax covered occlusal opening, were now completely encased in a plaster core. This procedure left a small void area around each root apex, which served as a freeway for the escape of air, and a reservoir for the escape of excess acrylic resin.

The plaster core was then invested in the injection flask with plaster of Paris (Fig. 2). After the plaster hardened, the flask was separated, and all remaining wax removed with boiling water and the halves of the flask bolted together. A small amount of acrylic resin colored with cadmium red was then prepared and when

FIG. 2. The tooth in the plaster core invested in the lower half of the flask.

of the proper doughy consistency was placed in the cylinder reservoir of the flask, the piston inserted and the spring assembly placed in position and pressure applied.

After processing and cooling the flask was opened and the tooth or teeth carefully removed from the plaster. All excess acrylic resin was trimmed from around the apices of the roots and the occlusal openings. The teeth were then placed in 10% nitric acid from seven to ten days for decalcification.

By carefully run tests, the acrylic resin was found to be chemically inert to the action of nitric acid in concentrations up to 50%.

To determine if the 3% hydrogen peroxide had any dissolving action on the internal calcified structure of the teeth, which might result in distortion of the root canal's form, numerous controlled tests were conducted. In all cases, the calcium found to be present in the hydrogen peroxide test solutions was of such minute amounts that it was considered to be of no relative importance in changing the form of the root canals, nor was the leaching action of the 3% hydrogen peroxide of such strength to produce artifacts in the root canals.

RESULTS

As previously mentioned, this investigation was concerned with a study of the morphology of the root canals of the primary molars. Eighty-seven acrylic reproductions of the root canals of the primary molars were made and studied. The specimens included twenty-five mandibular first molars, twenty-two mandibular second molars, seventeen maxillary first molars, and twenty-three maxillary second molars.

The eighty-seven acrylic specimens of the primary molars revealed that the

greatest amount of variation which occurred in the root canals, invariably occurred in the canals of the mesial roots. These variations usually originated in the apical region of the roots or in the region approximating areas of resorption.

Variations in the morphology of the canals of the mandibular primary molars may be noted first by a thinning of the narrow connecting isthmus between the buccal and lingual extremities in the apical region. Subsequent thinning of this isthmus produces a complete separation of the root canal into two or more individual canals. Intermediate stages may occur in the root canal before they completely separate into two or more canals. These intermediate stages result in "isolated areas" or voids in the isthmus. Across these void areas may radiate fine connecting branches and lateral fibrils. These fine branches and fibrils then form a fine network between the buccal and lingual extremities of the two root canals (Figs. 3 & 4).

These variations likewise occurred in both the mesial and distal roots of the mandibular primary molars. Zurcher[1] stated that "Differentation always begins in the mesial root but it may commence in the distal root before the complete division of the mesial root canal into two canals."

Table 1 shows the prevalence of the variations which occurred in the mesial and distal root canals of the mandibular first and second primary molars.

The same variation in form that was observed most frequently in the mesial root canal of the mandibular molars also was found to occur in the mesio-buccal root canal of the maxillary molars. In the three-rooted type of maxillary molar, the disto-buccal and lingual root canals showed few, if any, variations in form. In the two-rooted type of maxillary molars where the disto-buccal and lingual roots were fused, considerable variation was noted. Where there was fusion of the two roots, specimens showed the disto-buccal and lingual root canals to be connected by a narrow isthmus. The number of canals varied from one to two depending on the extent of the connecting isthmus. Zurcher[1] made reference to the occurrence of the two-rooted type maxillary molar but did not mention the variations which occurred within the canal. He did observe that there was separation of the mesio-buccal root canal into two canals (Figs. 5 & 6).

Table 1 shows the prevalence of variations which occurred in the mesio-buccal, disto-buccal, and lingual root canals, and also in the fused disto-buccal and lingual root canals of the maxillary molars.

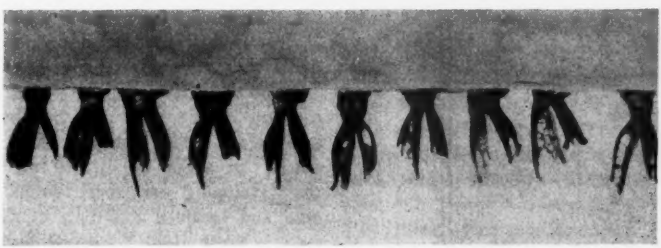

FIG. 3. Specimens of the mandibular first primary molar. The mesial root is to the left on the specimens and the distal root to the right. Both roots show varying amounts of variation.

FIG. 4. Specimens of the mandibular second primary molar. The mesial root is to the left on the specimens and the distal root to the right. Observe variations occurring in the root canals from left to right.

TABLE 1

Variations Occurring in the Root Canals of the Primary Molars

	One Canal	Two Canals	Three Canals	Other Variations*	No. of Specimens
Mandibular 1st Molar					
Mesial root	5	6	0	14	25
Distal root	17	0	0	8	25
Mandibular 2nd Molar					
Mesial root	5	7	2	8	22
Distal root	18	3	0	1	22
Maxillary 1st Molar					
Mesio-buccal root	8	6	0	3	17
Disto-buccal root	10	0	0	2	12
Lingual root	12	0	0	0	12
Fused disto-buccal & lingual roots	1	4	0	0	5
Maxillary 2nd Molar					
Mesio-buccal root	11	4	1	7	23
Disto-buccal root	15	0	0	0	15
Lingual root	15	0	0	0	15
Fused disto-buccal & lingual roots	3	5	0	0	8

* Variations such as void areas, connecting branches, lateral fibrils, and apical ramifications.

It will be noted from Table 1 that the number of root canals which were present in the mandibular and maxillary molars varied from two to five. Some specimens showed only two root canals, others three, four, and three specimens, five. The number of root canals depended on the amount and degree of variation occurring within the canal.

DISCUSSION

Zurcher[1] stated that he used only teeth showing no evidence of macroscopic root resorption and those showing no evidence of pathology, so as to obtain a truer reproduction of the root canals and rule out any possible changes which might occur in the root canals from these processes. All teeth used by Zurcher[1] were from children four to seven years of age.

It is interesting to note that the evidence presented by Orban,[14] Kronfeld,[15] Noyes, Schour and Noyes,[16] does not agree with Zurcher's time table of root resorption. Orban[14] states, "extensive resorption of the roots can be observed long before actual shedding." Kronfeld[15] states, "at about the age of four years the developing permanent germs lying near and between the roots of the deciduous teeth begin to cause resorption of the latter."

Some of the teeth selected for this study showed no evidence of visible

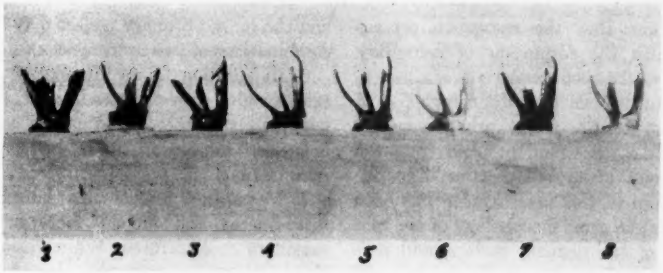

FIG. 5. Specimens of the maxillary first primary molar. The mesial roots to the right in the specimens show the greatest degree of variation. Specimen #1 shows fusion of the disto-buccal and lingual roots.

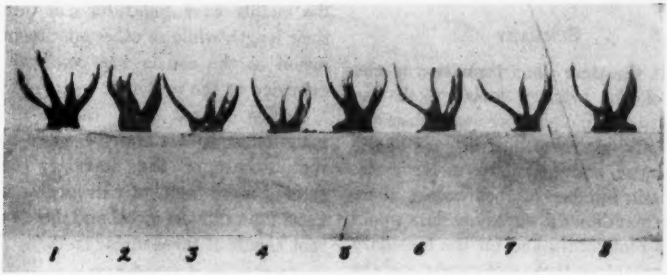

FIG. 6. Specimens of the maxillary second primary molar. The mesial root is to the right in the specimens. #1. A four rooted specimen. #2. Two rooted type, with fused disto-buccal and lingual roots. #5. Two rooted type showing some variation and the loss in part of the connecting isthmus between the disto-buccal and lingual roots. #3 & 6. Mesio-buccal root almost completely divided into two canals.

macroscopic root resorption while others showed varying amounts of root resorption. It was first believed and later verified by the results of the investigation, that such a selection of teeth would produce a more representative picture of the changes that take place in the root canals as the teeth matured and the resorptive process progressed.

Zurcher[1] commented that, "The wide variations occurring in the root canals of the milk teeth resulted from the deposition of physiological secondary dentin." Zurcher offered no evidence to substantiate this belief. However, later reports of other investigators[11, 12, 13, 19] have shown that Zurcher was correct in assuming that the shape of the root canals of the primary teeth may be influenced by the deposition of secondary dentin.

Furthermore, it was observed that in those teeth which showed evidence of root resorption, the amount of variation occurring in the root canals was greater than in those showing no visible sign of resorption. Variations were not observed in the root canals of the teeth where root formation had just been completed or in those teeth where root formation was not complete.

From the observed evidence and pending further investigation it seems logical

to assume that the resorptive process stimulates the formation of secondary dentin in the root canals.

It can be seen that the complexity of the root canals of the primary molars presents a discerning problem from the standpoint of clinical practice. The primary aim of this investigation has been to show the gross morphology of the root canals of the primary molars, and it is hoped that from this study, the way will be paved for the promotion and development of better root canal therapy for the primary teeth.

Summary

1. At the time when formation of the roots of the primary molar teeth has been just completed, there was observed to be only one root canal in each of the mandibular and maxillary molar roots. The basic number of root canals, then, for the mandibular primary molars would be two root canals and for the maxillary primary molars, three root canals, and the basic morphological pattern of the root canals conforms in outline to the external form of the root.

2. Following root formation the basic morphological pattern of the root canals may change, producing variations and eventual alteration in the number and size of the canals.

3. The deposition of secondary dentin is responsible for the variation and changes in the anatomical form of the original root canals.

4. It was observed that these variations in root canal form were more pronounced in those teeth which showed evidence of root resorption, than in those teeth with no evidence of root resorption.

5. The first primary molars may have combinations of two to four root canals and the second primary molars may have combinations of two to five root canals.

6. In addition to the number of root canals which may be encountered, there may be such other variations as lateral branches, connecting fibrils, and apical ramifications.

7. It was not uncommon to find the disto-buccal and lingual roots of the maxillary molars fused. When fusion of these roots occurred, the disto-buccal and lingual root canals were also fused. However, the extent of the fusion of the root canals varied. In some specimens the canals were fused for one-third of their length while in other specimens the fusion of the canals was complete and extended to the root apex.

8. The mesial root canals of the mandibular molars and the mesio-buccal root canals of the maxillary molars showed more frequent and greater variations than did the distal and disto-buccal root canals of these molar teeth.

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BIBLIOGRAPHY

1. Zurcher, Ernest: The Anatomy of the Root Canals of the Teeth of the Deciduous Dentition and of the First Permanent Molars. New York, William Wood and Co. 1925.
2. Gerlach, Elsie: Root Canal Therapy. Dental Survey, 8: 68-74, 1932.
3. Foster, H. R.: The Pulpless Deciduous Teeth. J.A.D.A., 23: 2057-2065, 1936.
4. Hogeboom, F. E.: Practical Pedodontia or Juvenile Operative Dentistry and Public Health Dentistry. Fifth Edition, St. Louis, C. V. Mosby Co. 200-206. 1946.
5. McBride, W. C.: Juvenile Dentistry. Philadelphia, Lea and Febiger, 186-187, 1941.
6. Wagner, R. O.: Pulp Treatment of Deciduous Teeth. J.A.D.A., 27: 1083, 1940.
7. Sweet, C. A.: Treatment and Maintenance of Pulpless Deciduous Teeth. J.A.D.A., 22: 1972, 1935.
8. Zeisz, Robert, & Nuckolls, James: Dental Anatomy. Part II The Form and Function of the Deciduous Teeth, St. Louis, C. V. Mosby Co., 351-458, 1949.
9. Wheeler, R. C.: A Textbook of Dental Anatomy and Physiology. 2nd Edition, Philadelphia and London, W. B. Saunders Co., 91-128, 1950.

10. Stillson, W. C.: Dental Anatomy, Philadelphia and London, W. B. Saunders Co., 197-208, 1929.
11. Ireland, Ralph L.: Secondary Dentin Formation in the Deciduous Teeth, J.A.D.A., Vol. **28**: 1626-1632, 1941.
12. Bevelander, G. and Benzer, S.: Morphology and Incidence of Secondary Dentin in Human Teeth. J.A.D.A., Vol. **30**: 1079, 1081-1082, 1943.
13. Delio, C. A.: The Incidence of Secondary Dentin Formation in Primary Molars, Unpublished Thesis, 1950.
14. Orban, B.: Oral Histology and Embryology, Second Edition, St. Louis, C. V. Mosby Co., 313, 1949.
15. Kronfeld, R.: Kronfeld's Histopathology of the Teeth and Their Surrounding Structures. 3rd Edition, Reviewed and Reedited by Paul E. Boyle, Philadelphia, Lea and Febiger, 271, 1949.
16. Noyes, Schour, and Noyes: Dental Histology and Embryology. Philadelphia, Lea & Febiger, 318, 1938.
17. Benzer, Sidney: The Development and Morphology of Physiological Secondary Dentin, Jour. of Dent. Res., 640-646, Oct. 1948.
18. Hess, Walter: The Anatomy of the Root Canals of the Teeth of the Permanent Dentition. New York, William Wood and Co., 1925.
19. Largent, M. D.: Secondary Dentin Formation in the Root Canals of the Primary Molars. Unfinished Report, 1951.

The Pedodontist and the Cleft Palate Patient

RALPH B. NEADERLAND, D.D.S., M.S.

THE cleft palate patient presents a challenge to the dental profession from the moment of birth. Even after the most successful surgery, there may be residual dental problems.

The relationship of the child to his injured mouth and to the dentist who cares for it begins with his first awareness of himself as an individual. Such a handicapped area becomes the focal point of conscious and unconscious phantasies usually centering about a distorted body image. The healer, in this case the dentist, can become a savior-like figure if he succeeds, or a persecutor if he fails to help the child. Because the usual problems of dental indoctrination and treatment acceptance are complicated by the more intense and prolonged care required in these cases, the early establishment of an easy and trusting relationship must be achieved. This must be accompanied by evident improvement in the oral condition.

I. THE OBTURATOR

A. Before Surgery. The obturator, modified for ease of construction and insertion, made non-irritating to the tissues, easy to sterilize and safe to use, is necessary for the closure of the hard palate during the early days and weeks of nursing.

This appliance, constructed of clear self-curing acrylic, is made with silver foil insets for easy visibility. Identification can be included in the same way. The obturator can be constructed quickly after a compound impression is made and poured up. The alveolar ridges are covered for retention, and as much of the palate as is necessary for closure.

The obturator is 'safety locked' by string attached both to it thru a loop and to the feeder's clothing with a safety pin. The obturator can be sterilized by boiling and kept in a normal temperature sterile distilled water solution between usings. It is placed in the mouth immediately before feeding, and removed immediately after feeding (Fig. 1).

B. After Surgery. If the hard and soft palates are completely restored to normal form and function as a result of surgical intervention the need for an obturator is passed. However the original or a modified appliance can be used during the healing process to reduce the stress on the tissues during meal time sucking.

In case of surgical failure, a similar appliance with allowance for the erupting or erupted primary teeth can be used until the time for future surgery comes (Fig. 2).

II. ARCH DEVELOPMENT

A. The Alveolar Cleft.

1. During the eruption of the primary teeth.

When the cleft appears in the alveolar process as well as in the hard or soft palate, or when it appears in the alveolar process alone, which is rare, the

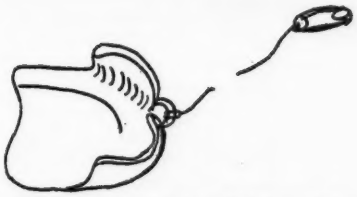

FIG. 1. Obturator for use during nursing

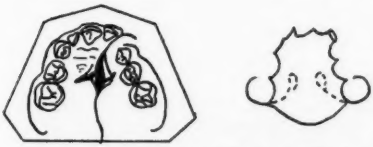

FIG. 2. Study model of cleft palate after two surgical failures. Appliance used in this case.

pedodontist has a special responsibility. By the time of eruption of the primary anterior teeth x-rays should be taken to determine the presence or absence of the individual primary teeth and the possible presence of supernumerary primary teeth (Fig. 3).

If a supernumerary tooth is present but does not interfere with the normal eruption and positioning of the primary teeth, its removal may be postponed. However, if it is an obstacle to the normal eruption and/or positioning of the primary teeth, the supernumerary tooth should be removed.

Special care must be taken during the extraction of these teeth if they are in or near the line of the cleft, lest excessive pressure disturb the incompletely calcified new bone, or tear the soft tissue union if there has been no true bony union established.

2. After the primary dentition is complete (Fig. 4).
   a. *Study models.* A complete set of study models should be made every year (and kept) to watch the primary dentition and then to predict permanent arch form.
   b. *Caries control.* It is very important that the primary arch be maintained in integrity and health. If there are supernumerary or missing permanent teeth, the problems in the transitional and permanent dentitions will be severe enough so that we must avoid at all cost

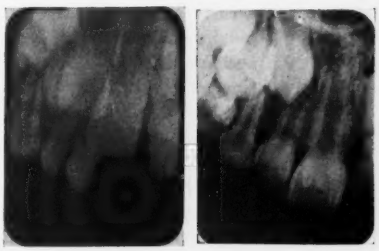

FIG. a FIG. b

FIG. 3 (a) Supernumerary primary and permanent laterals preventing normal eruption. 3 (b). Normal eruption and development following removal of both supernumerary teeth.

FIG. 4. Carious primary central embedded in soft tissue cleft after surgery.

the premature loss of the primary teeth or of arch length thru interproximal caries. Sugar control and fluoridization should be instituted from the start.

c. *X-ray Studies.* The development of the permanent tooth buds should be watched annually by full mouth x-ray series. Supernumerary or missing permanent teeth can thus be detected and plans can be made for the guidance, control and correction of the permanent arch.

d. *Habit control.* The effects of all habits such as finger sucking, lip biting, tongue thrust, etc. are sometimes overbalanced by the oral needs of the child during the time of the primary dentition in the normal child. This cannot be the case where the alveolus or the palate have been disrupted. Oral habits must be carefully controlled so that further damage to the arch form is avoided. The same appliance used as an obturator or retainer can be modified for the control and elimination of harmful oral habits.

e. *Arch form and tooth position.* Wherever possible, mutilation of the primary arch should be corrected during the primary dentition unless this entails the overburdening of the young child by difficult and complicated orthodontic procedures.

3. The transitional dentition.

Since most alveolar clefts occur in the anterior segment, the sixth to the tenth years are the most significant in the development of the arch in such cases. Study models, x-rays and caries control are continued. Supernumerary teeth are removed as soon as possible, and the permanent teeth observed carefully during their eruption. The Hawley retainer with modification is most useful to guide the eruption of the permanent teeth, correcting individual tooth position, maintaining space for missing teeth and guiding entire segments into proper position by the direction of the forces of eruption.

B. The Surgically Corrected Palatal Cleft.

Even when the hard palate is completely closed by surgical intervention and even when there is no alveolar cleft, dental care is complicated. Serial study models during the primary and transitional dentition are the only permanent record and guideposts to the prediction of lateral growth of the alveolus. The prevention and correction of the frequent unilateral or bilateral crossbite is most easily done thru early intervention.

Summary

Dental care for the infant, child and adolescent cleft palate patient is specialized and prolonged. From infancy on, with or without oral intervention, control

of the palate, the constantly developing dentition, and the total oral health can best be served by the careful and constant application of all the preventive and corrective dental techniques now in the hands of the pedodontist.

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Material intended for Unit News should be sent to Ted Levitas, 340 Boulevard N.E., Atlanta 12, Georgia. Dead line dates are: 4th Q, September 15; 1st Q, January 1; 2nd Q, March 15; 3rd Q, July 1.

Excessive Salivation—A Case Report

WOODROW S. MONICA, D.M.D.

NELSON[1] stated that ptyalism is caused by anticipated pain, nervous afflictions, nausea following metallic poisoning, irritation from oral lesions and teething.

The following case report suggests a condition of excessive salivation caused by a severely mutilated dentition.

CASE REPORT

In August 1957, an 8 year old high-strung boy complained of acute pain in the left superior primary molar area. His father said that the boy had salivated profusely for the past four months. The boy used about six dozen handkerchiefs a week to absorb the saliva and played with one in his mouth in order to contain the flow. At night the saliva foamed about his mouth to the size of a cup and dampened his pillow.

The boy appeared pale, underweight and slovenly. Two competent pediatricians ruled out any physical or nervous affliction and suggested the boy see a dentist.

The oral examination revealed three acutely abscessed primary molars with fistulae, six severely carious primary teeth and one carious permanent molar.

From August to September 13, three infected molars were extracted; six primary teeth were restored with compound amalgam restorations and the left superior first permanent molar was restored.

Shortly thereafter the saliva became thicker and less profuse. Two weeks later the excessive salivation subsided. One month later the boy had gained weight and exhibited an excellent rapport at home and school.

COMMENT

Sensory afferent fibers of the central and autonomic nervous systems govern by reflex action the flow of saliva. The secretion is influenced by sight, taste, smell, thermal, chemical and mechanical stimuli. In addition, stimulation of the sympathetic fibers after excitation of the parasympathetic causes an augmented secretion.[2]

Since the ptyalism in this case report was experienced continuously, the first four stimuli cited above must be eliminated. The excessive salivation was not a physiological compensatory mechanism inasmuch as the salivary glands were neither malformed, diseased nor neoplastic; rather it was a pathological condition in which the afferent fibers of the autonomic system were stimulated by sharp, carious teeth and infected teeth and gingivae.

CONCLUSION

The patient suffered a reversible ptyalism caused by the irritation of infected and carious teeth.

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BIBLIOGRAPHY

1. NELSON, WALDO E.: Textbook of Pediatrics 6th ed. W. B. Saunders Co. Phila. 1954, p. 654.
2. FULTON, J. F.: A Textbook of Physiology Ed. 17. Phila. W. B. Saunders Co. 1955, pp. 981-984.

Report of Pedodontic Conference

THE third annual pedodontic conference under the auspices of the Northwestern University Dental School was held at Chicago on June 10 and 11. In attendance were pedodontic teachers from Loma Linda, California to Halifax, Nova Scotia.

Dean Teuscher welcomed the conferees and stated the theme of this year's conference as a curriculum to overcome the problems of practice.

The program for the first day was begun by Dr. G. K. Yacorzynski, of the psychiatric staff of the Northwestern University Medical School, who spoke on the "Psychological Aspects of Dental Care of Children." Dr. Yacorzynski mentioned the development of dentistry as a separate speciality because of the requirement for special skills and their application. The mouth being an area of satisfaction for the basic drive of hunger, the knowledge of psychiatric implications for this area is a "must" for every dentist. He also said that no reaction is an accident but has been conditioned by previous experience and is definitely modified by the effect of the dentist's own personality.

Dr. Maury Massler of the University of Illinois next spoke on "Oral Habits: Origin, Evolution and Management." Dr. Massler explained the development of oral habits from sucking of fingers and nipple through the biting stage to the stage of multiple transfers. He emphasized the difference in sucking habits. The relaxed, peaceful, normal sucking which is not damaging to dentition and the compulsive, angry sucking which is habituating and may be an unbalancing factor in the genetic pattern which will contribute to the Class II Division 1 malocclusion so often associated with this habit.

Miss Viola Theman, Professor of Education at Northwestern University spoke on the "Introduction of the Small Child to New Situations." She mentioned that the small child is very perceptive and that new situations pose a threat which will bring out behavior manifestations. It is important to know the limit of the transgressions you will put up with by the child before you can make a definite approach to control the child and the situation. The common errors in approach to the child are being too direct and making too much fuss. It is important also to remember the relative strangeness of men in a child's world.

Dr. Phillip Jay of the University of Michigan opened the second day's program with a discussion on "The Current Status of Our Knowledge of Dental Caries." Dr. Jay outlined the programs of the leading schools in dental caries research. He explained the Michigan Caries Control Plan by diet and emphasized the fact that the only known substance which will prevent dental caries is sodium fluoride.

Dr. Richard Tiecke discussed "Pathology in the Mouths of Children," and showed many interesting slides.

Dr. Norman Olsen, head of the Pedodontic Department of Northwestern University Dental School and Moderator of the conference, outlined the pedodontic curriculum as taught at Northwestern University and explained their application of the "Tell, Show, Do" method.

Dr. S. Rosenstein closed the program with a discussion of "Interceptive Ortho-

dontics." He included the development of abnormalities and serial extraction in his discussion.

The conference, as usual, introduced many new and challenging concepts in the ever enlarging field of pedodontics. It was interestingly presented and well received by all present.

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Redwood City
California

NOTICE

The following dentists were certified by the American Board of Pedodontics in July 1957. The next meeting of the Board will be held July 29-31, 1958 at the School of Dentistry, University of Indiana, Indianapolis, Indiana.

Dr. Joseph G. Keller
200 West 57th Street
New York 19, New York

Dr. Norman Feitelson
10 Taylor Place
Westport, Connecticut

Dr. Richard C. Haskins
601 Medical Arts Building
Salt Lake City, Utah

Dr. Clinton C. Emmerson
Rt. Box 196B
Hemet, California

Dr. Irving William Eichenbaum
24 Washington Street
New Britain, Connecticut

Dr. Solomon N. Rosenstein
630 West 168 Street
New York 32, New York

Dr. Walter Israel
1601 North Broadway
Santa Ana, California

Dr. Francis Leverne Bushnell
26 West Portal Avenue
San Francisco, California

Dr. A. M. Mickler
1974-A Douglass Boulevard
Louisville, Kentucky

Dr. Louis DeMeo
6743 Foothill Blvd.
Oakland 5, California

Dr. Evelyn M. Strange
2106 N. E. 47th Street
Portland, Oregon

Dr. Charles A. Sweet, Jr.
925 West 34th Street
Los Angeles 7, California

Miami Musing

Have you ever attended an annual meeting of the A.S.D.C.? If you haven't, you should. If you have, you'll know what I mean.

It's really a great experience.

First of all, all the names you've been reading in the A.S.D.C. Journal seem to come to life. Anderson . . . Burdge . . . Addelston, Brauer . . . and right down the line of A.S.D.C. personalities. Most of all, however, there are the A.S.D.C. members you may not hear about and don't read about all the time. These are the men—and women—from all over the country who make up our Society. Bob Burchesky, New York . . . Frank Steiger, Houston . . . John Bier, San Francisco . . . .

There was always a lot of commotion around the registration desk in the lobby. Maybe it was because there were souvenirs to be received or because a nice looking lady was giving out samples of Florida orange juice. Or maybe it was because you could see more people in the lobby than any place else. Neil Powell, Florida . . . Freeman Slaughter, North Carolina . . . Frank Tuma, Cleveland . . . .

Whenever you went into the business sessions you really had to pay attention because there was so much going on you could not afford to miss. But as soon as you got out into the lobby again, there was an ever-present hubbub—people talking—comparing notes—just making small talk. Ed Peaslee, Maine . . . Paul Weber, New Jersey . . . Business Manager Harwood, Baltimore . . . .

Of course, things did happen at the business sessions. Legislation pertinent to the welfare of the organization was discussed and acted upon. Outgoing president Burdge handled himself with great ease and conducted the meeting in an orderly manner. The committee chairmen making their reports did so with great dispatch. And who can forget Jim Simmons of Fort Worth as he marched in bedecked in cowboy attire from head to toe including chaps, boots and ten gallon hat, bearing a Texas standard? He and his crew left no doubt where the next A.S.D.C. meeting will be held. In a more serious vein, George Higue, California, received the praise of the assembled group for the splendid work he had done in his particular committee. Mode Perry, Southern California, more than held his own in a fine panel discussion, and Mel Noonan repeatedly brought up pertinent points from the floor.

The distaff side was ably represented—to mention just a few, by Ellen Crockett, Florida's dynamic personality; Virginia Englett, Georgia; Naomi Dunn, Connecticut; and Mary Lynn Morgan, Georgia. If nothing else, and there was plenty more, these ladies certainly added color to the meetings.

Somehow or other, though, you always wound up in the lobby again—either going to or coming from some place else. Sasser Watson, Florida . . . Sam Harris, Detroit . . . Dr. and Mrs. Ray Kielich, Buffalo . . . .

Table Clinic time came around, and the lobby actually seemed deserted—everybody was upstairs. Which one to see first? Where to start so you could be sure to see everything? How much time could you afford to spend at each one? None of these questions really could be answered. All the exhibits were so great, it was hard to leave any of them. But the crowds were still present, little groups—big groups—everyone talking at once. Fast moving Vic Lenchner, Florida . . . Roy Lindahl, North Carolina . . .

Milton Panzer, Michigan . . . Eddie Thomas, Alabama, (still talking root canal) . . . Jerry Hagen, Florida, (still talking space maintenance and his method) . . . .The Florida Public Health Service (still talking lacto bacillus count) . . . and in spite of all the confusion at the table clinics (and all the talking), it was well organized and well presented.

Back to the lobby this time, on the move toward something else. Chances are, everyone was now heading for the hospitality rooms. Charles Oxar, Florida . . . Russell Ford, Tennessee . . . Hugh Kopel, Michigan . . . . Texas and Florida were vieing for honors between their hospitality rooms, almost next door to each other. You could rest assured neither room would run low on liquid refreshments—perish the thought! —for to do so meant to have an empty room. And you can meet some of the nicest people there—Gold Dust twins Fred Erlich, Maryland, and Lee Nathans, Rhode Island . . . Norman Olsen, Northwestern . . . Galen Quinn, Tennessee . . . Bill Brown Michigan . . . Sidney Finn, Alabama . . . .

And then, inevitably, you found yourself back in the lobby. This time everyone is talking about the big Banquet. More than 200 showed up and Larry Burdge presided until he turned the gavel over to Al Anderson, who made an outstanding partner for the singer. As a matter of fact, in addition to his dentistry, he sings—specifically "I Can't Give You Anything but Love." Among those still talking—Carlos Criner and Tony Montero, Cuba . . . Don Gullett, Canada . . . Jack Carter, Kansas . . . Dave Law, Washington (State) . . . George Guest, Michigan . . . .

The last trip into the lobby is the one that takes you through the swinging doors and your way home. But all this can't begin to tell the story or list all the names. Too much goes on, too much is exchanged by way of words, too many new friends are made to merely jot it all down on a piece of paper. It's really too good to miss.

And if you missed this one, don't miss the next one. Besides, I understand the lobbies in Texas are beautiful, too!!?!

TED LEVITAS

Index

Adelson, Jerry J.: Erroneous concepts in the dental treatment of children with cerebral palsy, 247
Album, Manuel M.: General anesthesia and pre-medication in dentistry for children, 215
Amalgam, copper, 59
Analgesia, results, 167
  technique, 165
Anesthesia, 138
  extraction under, 109
  general, in dentistry for children, 215
    using di-vinyl ether, 219
    using trichlorethylene, 219
    using Vinethene, 219
  topical, 140
Anesthetic, determining correct dosage, 216
Ankylosis, of primary molars, 113
Apical inflammation, of primary teeth, effect on dental caries in permanent teeth, 209
Appointments, broken, management, 27
ASDC, amendments to constitution and by laws, 192
  annual meeting, program, 134
  Auditing Committee Report, 190
  Community Dental Health Programs Committee Report, 190
  Membership and State Units Committee Report, 190
  minutes of Executive Council Meeting, 189
  minutes of general business meeting, 191
  nominations and elections, 193
  officers for 1956–1957, 56
  President's Report, 191
  Professional Relations Committee Report, 189
  Reference Committee Reports, 191
  Schools and Dental Boards Committee Report, 190
  Secretary-Treasurer's Reports, 190

Barbiturates, results when used in premedication, 217
Basing materials, 60
Bite block, acrylic, 72
Book reviews, 54, 128, 206
Boone, George N.: Chrome alloy and its adaptation to a molar band technique, 45
Brown, William E.: minutes of ASDC business meeting, 191
Bruning, Lorna J., Leona Dunlap, and M. E. Mergele: A report of supernumerary teeth in Houston, Texas school children, 98
Buckley, Robert R.: Mouthpieces for the handicapped, 174

Calcification, of teeth, effect of carbohydrates ingested during, 211
Canker, treatment, 137
Carbamide, and dibasic ammonium phosphate caries-reducing effect of dentifrice containing, 237
  intermediate concentration, plus urease, effectiveness as dentifrice, 238
  high concentration, effectiveness as dentifrice, 238
  low concentration, effectiveness as dentifrice, 237
Carbohydrates, effect when ingested during calcification of the teeth, 211
  given during suckling, effect on carious lesions, 212
  restriction, evaluation, 145
Caries, distribution, by caries activity, using high urea dentifrice, 241
    using high urea dentifrice, 241
  effect of carbohydrates given during suckling period on, 212
  effect of high urea dentifrice on incidence of, 240
  in permanent teeth, effect of apical inflammation of primary teeth on, 209
  proximal, 35
  reducing, effect of a dentifrice containing 13% carbamide and 3% dibasic ammonium phosphate on, 237
  resulting from administration of sucrose, 212
Castration, in the female, 10
Castration complex in women, kleptomania and, 12
Castration fear, in the male, 4
Castrative significance, of tooth extraction, 3
Cavity, medication, 92
  preparation, 31
    histological factors, 31
    in primary teeth, 33
    pulp protection during, 92

Cement restorations, 61
Cerebral palsy, erroneous concepts in dental treatment of children with, 247
problems of speech in, 243
Child management, 21
Chaudry, A. P., H. C. Wittich, R. J. Gorlin, and A. R. Stoesz: Osteopetrosis. Report of a case, 41
Chrome alloy, adaptation to molar band technique, 45
forming a molar band from, 46
Chrome steel crowns, 61
Cleft palate, arch development in, 258
patients with, 258
use of obturator with, 258
Collins, LeRoy: Invitation to Florida, 40
Copper amalgam, 59
Crown, areas of sensation, 32
structure of permanent teeth, fracture of involving dentin, treatment, 198
involving pulp tissue, treatment, 200
Crowns, chrome steel, 61
Cysts, oral cavity, 116

Dam, rubber, acceptance by children, 231
application, in pre-school child, 230
to primary anteriors, 234
isolation of first and second primary molars with, 232
isolation of lower six year molar with, 235
isolation of second primary molar with, 231
technique of application, 232
use in restoring second primary molar, 235
Demerol, method of administering, 218
results in premedication, 217
working time, 218
Dental care program, indemnification schedule, 28
Dental development, 29
Dentifrice, high urea, caries increments during tests of, 240
methods of clinical testing, 239
Dentist, as father figure, 4
Dentist:patient ratio in U. S., 20
Dibasic ammonium phosphate, carbamide and, caries-reducing effect of dentifrice containing, 237
Diet, and the endocrines, 145
Dunlap, Leona, Lorna J. Bruning, and M. E. Mergele: A report of supernumerary teeth in Houston, Texas school children, 98

Economics of dentistry, 26
Ectopic first permanent molar, 153
Ectopic teeth, 68
Endocrines, diet and the, 145
Endodontics, 138
Ethyl chloride, use in dentistry for children, 138
Examination, 24
by x-ray, 110
Extraction, and masturbation, relation between, 8
as subconscious rape, in women, 13
castrative significance, 3
for orthodontic purposes, 73
in presence of infections, 108
of permanent teeth with primary, 110
psychological significance, 3
under anesthesia, 109

Father figure, dentist as, 4
Fechtner, Jerome L.: Pain control in dentistry for children, 163
Fees, setting and collecting, 26
Filling materials, effect on pulp tissue, 93
Florida, places to go; things to see, 185
Fluoride, sodium, vs. stannous fluoride, effectiveness, 194
stannous, vs. sodium fluoride, effectiveness, 194
topical application, new approach to, 194
Fluorine application, 144
Fractures, incisors, 65
From your president, 2, 58, 132, 208

Gingivitis, 136
Gish, Charles W., Charles L. Howell, and Joseph C. Muhler: A new approach to the topical application of fluorides in children, with results at the end of two years, 194
Gorlin, R. J.; Wittich, H. C.; Chaudry, A. P.; and Stoesz, A. R.: Osteopetrosis. Report of a case, 41

Haley, Melvin I., and Ralph R. Steinman: The biological effect of various carbohydrates ingested during the calcification of the teeth, 211
Handicapped, mouthpieces for, 174
Harris, Samuel D.: A digest of the practice of pedodontics, 18, 59, 136
Hemorrhage, stopping, 140
Herpes simplex virus, lesions in oral cavity, 115

Herpetic stomatitis, 136
Hess, Walter, and Paul Vogel: Clinical evaluation of caries-reducing effect of a dentifrice containing 13% carbamide and 3% dibasic ammonium phosphate, 237
Hibbard, Edwin S., and Ralph I. Ireland: Morphology of the root canals of the primary molar teeth, 250
Howell, Charles L., Charles W. Gish, and Joseph C. Muhler: A new approach to the topical application of fluorides in children, with results at the end of two years, 194

Incisors, central, case with four, 106
fractured, 65
Income tax deductions, for convention meetings, 173
Infections, extractions in presence of, 108
Ireland, Ralph L., and Edwin S. Hibbard: Morphology of the root canals of the primary molar teeth, 250

Kastein, Shulamith: Oral, dental and orthodontic problems of speech in cerebral palsy, 243
Kleptomania, and castration complex in women, 12
Korner, Anneliese F., and Norman Reider: Psychological aspects of disruption of thumbsucking by means of a dental appliance, 119

Lenchner, Nathaniel H.: A diagnosis and treatment plan for traumatized anterior teeth, 197
Levitas, Ted: Miami musings, 265
Lewis, Harvey A.: The unconscious castrative significance of tooth extraction, 3

Male, castration fear in, 4
Management, child, 21
Masturbation, and tooth pulling, relation, 8
Matrix material, choice, 60
McDonald, Ralph E., and Joseph C. Muhler: The superiority of topical application of stannous fluoride on primary teeth, 84
Mergele, M. E., Leona Dunlap, and Lorna J. Bruning: A report of supernumerary teeth in Houston, Texas school children, 98
Mesiodens, removal, 111
Miami musings, 265
Molar band, forming from chrome alloy, 46
technique, adaptation of chrome alloy to, 45
Molars, ankylosed primary, 113
first permanent, ectopic eruption, 153
primary, morphology of root canals of, 250
variations occurring in root canals of, 254
Monica, Woodrow S.: Excessive salivation—a case report, 262
Mouthpieces, for the handicapped, 174
Muhler, Joseph C.: The effect of apical inflammation of the primary teeth on dental caries in the permanent teeth, 209
and Ralph E. McDonald: The superiority of topical application of stannous fluoride on primary teeth, 84
Charles W. Gish, and Charles L. Howell: A new approach to the topical application of fluorides in children, with results at the end of two years, 194

Nail biting, prescription for, 68
Neaderland, Ralph B.: The pedodontist and the cleft palate patient, 258
Nembutal, method of administration, 218
Noonan, Melvin A.: Pulp management for the child patient, 91

Obturator, use in cleft palate patient, 258
Oral cavity, appearance of systemic disorders, 117
cysts, 116
herpetic lesions in, 115
tumors, 116
Oral surgical problems in children, 108
Oresch, George E.: Case report, 106
Oropharynx, herpetic lesions, 137
Orthodontics, interceptive, 76
preventive, 76
Osteoporosis, 41

Pain control, 163
analgesia technic, 165
review of literature, 163
Palate, cleft, patients with, 258
Patient:dentist ratio in U. S., 19
Payment, management, 26
Pediatrician, symptoms for, 115
Pedodontic Conference, report of, 263
Pedodontics, American Board of, certification to, 264
Pedodontics, capsule comments on, 147
digest to practice of, 18, 59, 136
educational requirements, 81

field for interceptive and preventive orthodontics, 76
observations on, 149
responsibility of, 77
Periodontal conditions, 136
Permanent teeth, and primary teeth, structural differences, 30
effect of apical inflammation of primary teeth on caries in, 209
removal with primary, 110
Polishing paste, formula, 23
Powell, D. Lee: Welcome to city of Miami, 17
Premedication, 143
causes of poor results in, 216
in dentistry for children, 215
methods of administration, 218
results of barbiturates in, 217
results of demerol in, 217
suggested for preanesthesia, 221
Preorthodontics, 65
Primary teeth, and permanent teeth, structural differences, 30
cavity preparation, 33
effect of apical inflammation of, on dental caries in permanent teeth, 209
retention, 114
Prophylaxis, 23
formula, 23
Proximal caries, 35
Psychological aspects, of thumbsucking disruption, 119
Ptyalism, 262
Pulp, capping, 62
effect of filling materials on, 93
management, 91
for histological consideration, 91
morphology, 91
protection, during cavity preparation, 92
vital exposures, 94
Pulpotomy, 62

Rape, subconscious, extraction as, in women, 13
Rate schedule, insurance plan, 28
Rattner, Lewis J.: Report on Pedodontic Conference, 263
Reider, Norman, and Anneliese F. Korner: Psychological aspects of disruption of thumbsucking by means of a dental appliance, 119
Restorative materials, 60
Roots, atypical resorption, 111
canals, of primary molars, morphology of, 250
variations occurring in, 254
structure, of permanent teeth, fracture, treatment, 202
Rubber dam. *See* Dam, rubber

Salivation, excessive, case of, 262
Seconal, dosage table for, 217
method of administration, 218
working time, 218
Separators, insertion technic, 36
technic, purposes, 37
Shira, Robert B.: Oral surgical problems in children, 108
Sodium fluoride, 144
Space maintenance, 66
Space maintainer, placement, 70
technique for producing, 70
Speech, dental problems, in cerebral palsy, 243
oral problems, in cerebral palsy, 243
orthodontic problems in cerebral palsy, 243
Stannous chloride, 145
Stannous fluoride, topical application on primary teeth, superiority of, 84
Starches, effect on caries, 146
Starkey, Paul: The application of the rubber dam in the preschool child, 230
Steinman, Ralph R., and Melvin I. Haley: The biological effect of various carbohydrates ingested during the calcification of the teeth, 211
Stoesz, A. R.; Wittich, H. C.; Chaudry, A. P.; and Gorlin, R. J.: Osteopetrosis. Report of a case, 41
Suckling period, carbohydrates given during, effect on carious lesions, 212
Sucrose, caries resulting from administration of, 212
Sugar, effect of elimination from diet, 146
Supernumerary teeth, 68
in Houston, Texas school children, 98
presence of, 111
Surgery, oral, problems in children, 108
Sweet, Charles A., Jr., and Joe G. Sweet, II: The health of the child is dependent on dental x-rays, 52
Sweet, Joe G., II, and Charles A. Sweet, Jr.: The health of the child is dependent on dental x-rays, 52

Teeth, infected, disposition of, 109
permanent, traumatic displacements, treatment, 203
primary, and permanent, structural differences, 30

displacement of, treatment, 204
fractures, involving crown structure, treatment, 204
involving root structure, treatment, 204
traumatized anterior, diagnosis and treatment plan for, 197
Thumbsucking, 68
disruption by dental appliance, psychological aspects, 119
prescription for, 68
Tongue blade, 70
Tooth, castration fears of losing, genesis, 8
first loose, psychological effects, 7
within a tooth, 115
Trichloroethylene, technique for using, 220
use in general anesthesia, 219
Tumors, of oral cavity, 116

Unit news, 49, 87, 179, 224

Vincent's infection, 136
Vinethene, use in dentistry for children, 139, 219
Vogel, Paul, and Walter Hess: Clinical evaluation of caries-reducing effect of a dentifrice containing 13% carbamide and 3% dibasic ammonium phosphate, 237

Wessels, Kenneth E.: Pedodontics—the field for interceptive and preventive orthodontics, 76
Wittich, H. C.; Chaudry, A. P.; Gorlin, R. J.; and Stoesz, A. R.: Osteopetrosis. Report of a case, 41

X-ray examination, 24, 110
dependence of health of child on, 52

Young, Dorothy H.: Ectopic eruption of first permanent molar, 153